The NATIONAL GEOGRAPHIC MAGAZINE

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"Photographing Wild Game with Flash-light and Camera"

By Hon. GEORGE SHIRAS, Third
Member of Congress 1903-1905

With a Series of 70 Illustrations of Wild Game—Deer, Elk, Bull Moose, Raccoon, Porcupine, Wild Cat, Herons, Ducks, Snowy Owl, Pelicans, Birds in Flight, etc.

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Flashlight. Wild Cat or Lynx?

Loon Lake, 125 miles north of Georgian Bay, Canada

VOL. XVII, No. 7 WASHINGTON JULY, 1906

THE NATIONAL GEOGRAPHIC MAGAZINE

PHOTOGRAPHING WILD GAME WITH FLASH-LIGHT AND CAMERA*

Copyrighted, 1906, by George Shiras, 3rd

BY HON. GEORGE SHIRAS, 3RD

MEMBER OF CONGRESS, 1903–1905

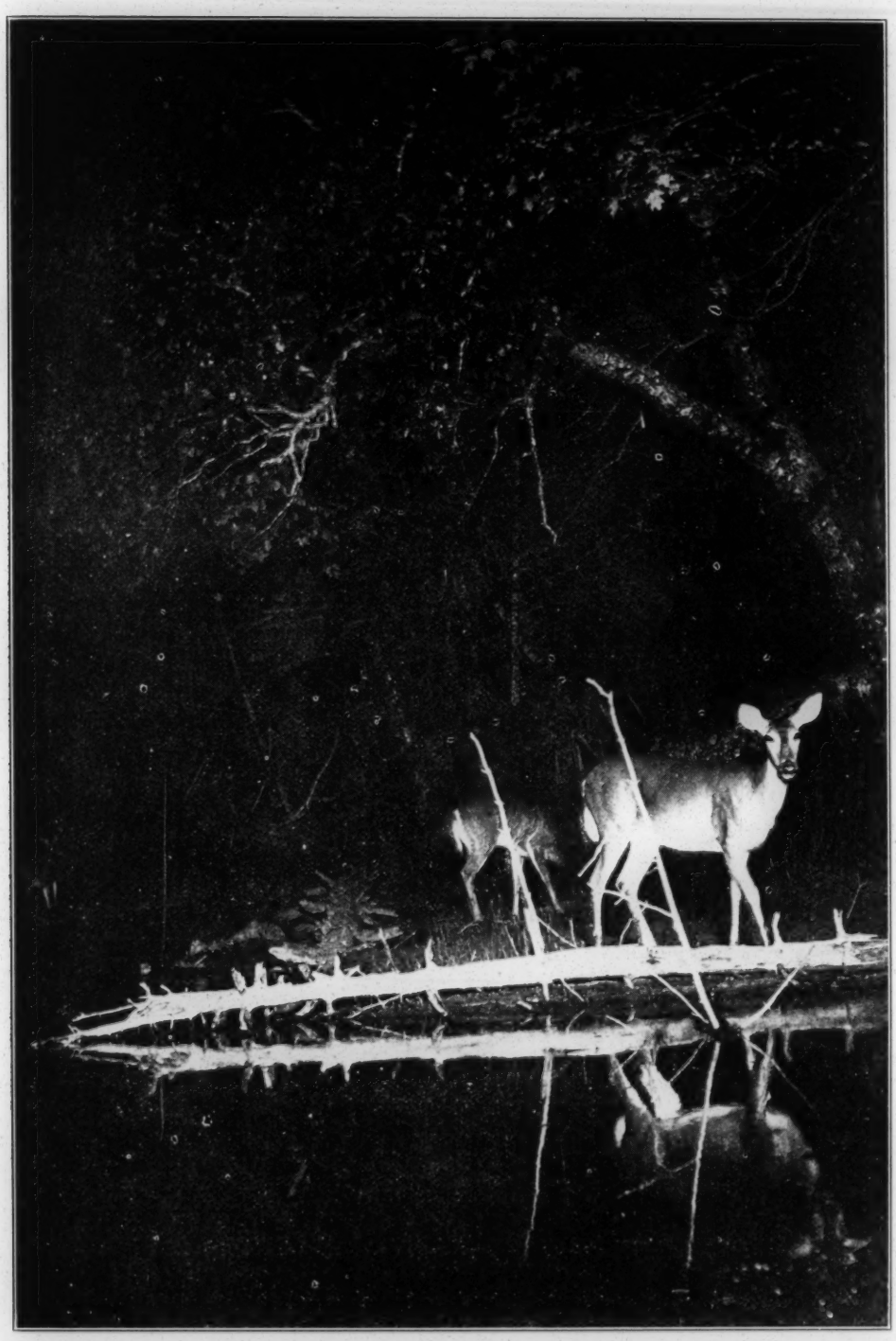
Mr Shiras was the originator of the sport of hunting wild game with the camera, and for twenty years has devoted his vacations to this fascinating recreation. The methods and implements which he invented have been adopted throughout the world, and have greatly simplified and popularized this branch of photography and sport. Mr Shiras has made it a point never to photograph animals in parks or reservations, all of his shooting being directed against game in the strictest sense wild. The pictures printed in this number were all taken by him, and it is the first time that he has permitted their publication. Several of the flash-lights, those on pages 376, 377, 378, 379, 382, 383, 384, 385, 386, and 387, were exhibited at the Paris Exposition in 1900, where they received a gold medal, and they were again exhibited at St Louis in 1904, receiving a Grand Prize. The reader of this article must admit that no line of sport requires greater patience, perseverance and skill, or is rewarded with such rich and lasting trophies. The game which Mr. Shiras has bagged during these twenty years, he shares with many thousands the world over.

LOOKING back to that period, many years ago, when the finger eagerly pulled the trigger and the eye anxiously sought to pierce the momentary veil of smoke between the gun and its intended victim, and then to that later period, when the simple pressing of a button captured, for all time, the graceful image of the hunted quarry, one becomes conscious of a peculiar mental evolution. Success in the hunting field should properly be dominated by a keen sense of pleasure which, if absent or but a minor incident in the chase, indicates a misdirected effort. We all know, today, that the average successful and contented sportsman will admit that the mere taking of animal life is regarded as an apparently unavoidable incident in the gratification of desires existing wholly apart from the shedding of blood. One purpose of this article is to show that the time has come when it is not necessary to convert the wilderness into an untenanted and silent waste in order to enjoy the sport of successfully hunting wild birds

*An address to the National Geographic Society, April 6, 1906.

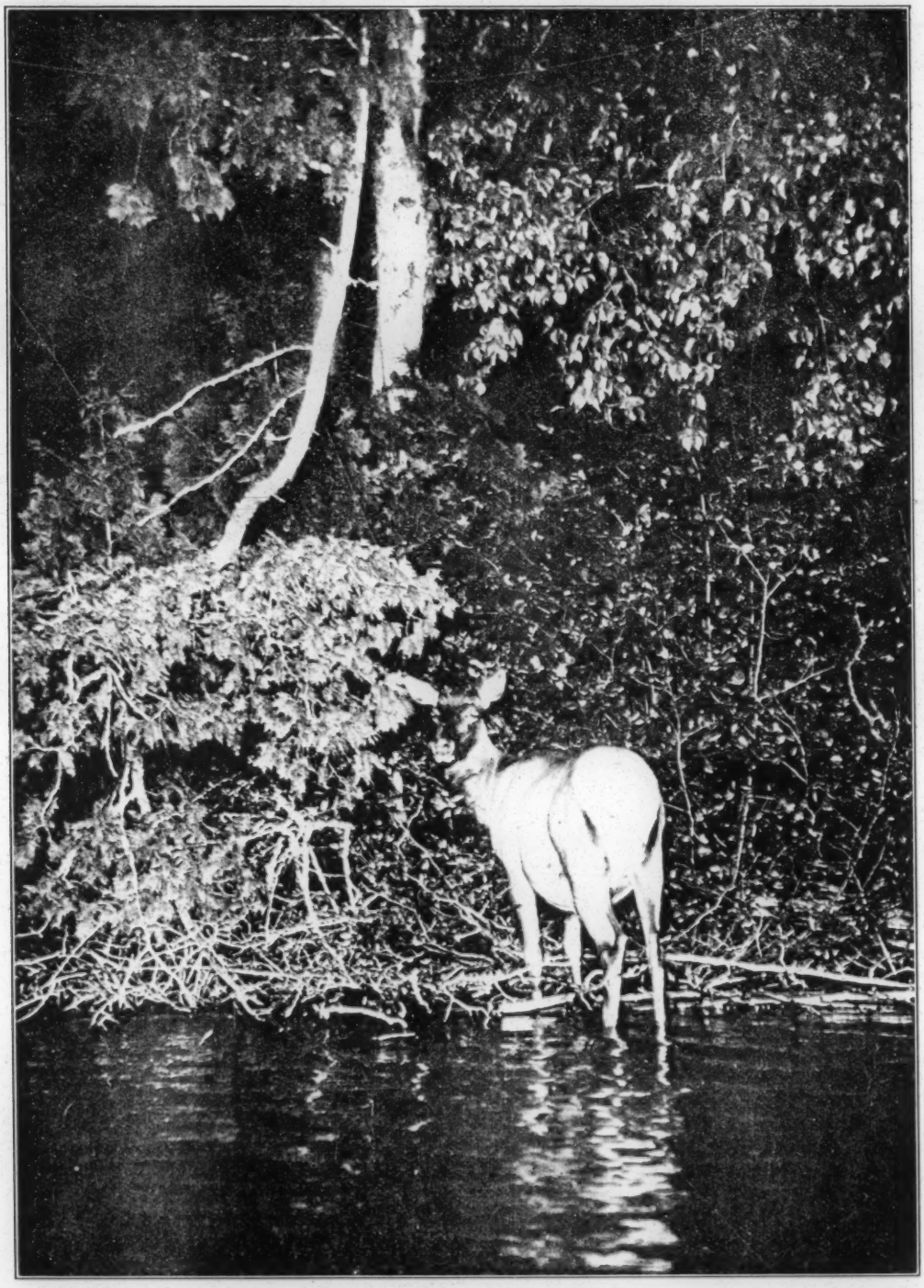
Flashlight. Boat Rigged for Night-hunting with Cameras, showing Flashlight Apparatus and Jack Lamp

and animals. So many advocates of hunting with the camera have been heard of late, that my voice need no longer be raised in behalf of this sensible and attractive pastime, were it not that the majority of such writers, coming from the ranks of the naturalist and the amateur photographer, almost invariably decry the sportsmen as a set of ruthless butchers, blind alike to the beauty of wild life and to the ethics of ordinary decency. No greater error could exist or its effects be more unfortunate. Sportsmen, the world over, constitute a high order of citizenship; generous, self-reliant, and faithful, they have done much in keeping up the virility of the race, and in leavening those debasing influences of over-civilization. The all-inspiring motive of every true sportsman is fair play and a fair chance to the animal or bird whose life may pay the forfeit in the contest. The salmon must be lured from the foam-crested pool with a fragile, artificial fly and landed with a rod so light that perhaps an hour may pass before the hand-net is used; the grouse must be plucked from mid-air by a tiny gun, and the mountain sheep shot at 500 yards with a bullet smaller than a pencil tip. Within the ranks of civilized man, where do such rules prevail? In business competition, in the race for social and public honors, in all those contests wherein Mammon or

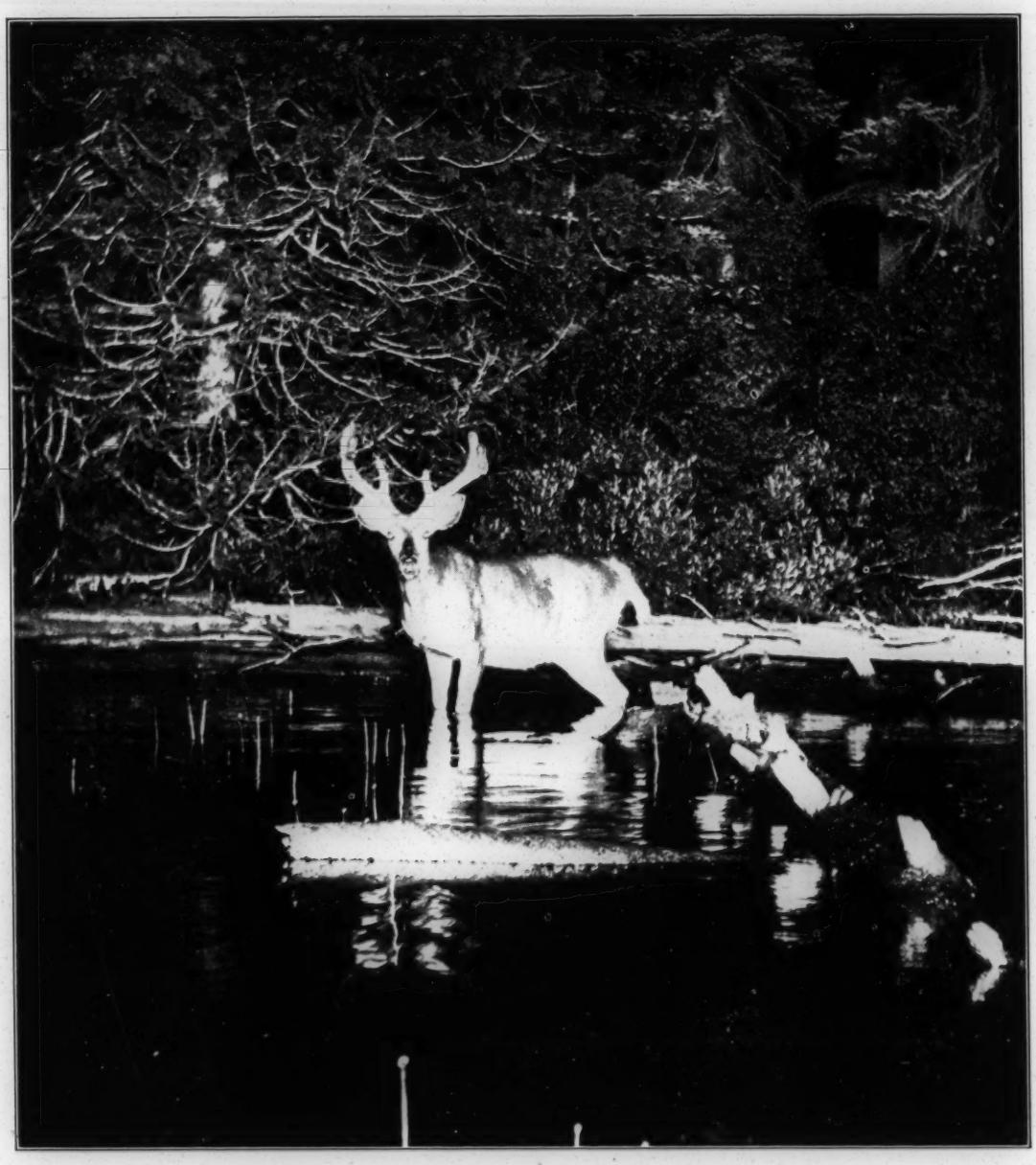


Flashlight. Large Doe and Yearling Buck, Feeding at the Mouth of the Upper White Fish River, Michigan

Flashlight. Elk Naturalized on South Shore of Lake Superior. Three cows and a native calf



Flashlight. Young Bull Elk, Feeding on Maple Leaves, Small Lake, Upper Michigan



Flashlight. Red Deer, Chinichoochichi Lake, Canada

When flash was fired the animal was mistaken for a caribou

Ambition holds the tiller and guides man on to victory or defeat, how often is the "square deal" the guiding light? Would any one suppose if President Roosevelt, after his graduation from æsthetic Harvard, had spent his life within the narrow sphere of his birth that his career would have been the same? Or that if he had

The Hunter's Victim

Mortally wounded before a snow storm, it was never found by the hunter

merely lived within a Dakota ranch, with his hand on the branding iron and his mind upon the cash value of each season's round-up, that his nature would have been the same? Self-reliance, quickness of purpose and of action, and a broad view of man as Nature's noblest creation seldom come to one who forms but an insignificant atom in a conventional assembly of mankind. While, therefore, it becomes my part to point out an additional and perhaps wholly superior method of enjoyment for the wilderness hunter, I can but protest against any crusade which by maligning the sportsman may prejudice him against the camera, or what is even worse, lead him to give up his yearly visits to Nature's realms, wherein lies the inspiration for a better and stronger life within the city's walls.

Many years had elapsed before the advent of the hand camera made game photography at all practicable, but within two seasons, after my experiments with it, the full possibilities began to be most apparent. It may, therefore, be of interest in this connection to reprint a few extracts from the first article ever published advocating the use of the camera in the field of sportsmanship:*

"A sportsman's life consists largely of three elements—anticipation, realization, and reminiscence. We look forward to

*Forest and stream, 1892.

Deer Taking its own Picture

The thread attached to the camera stretches from bank to bank. The picture was taken in June and shows the gaunt character of the deer during the fly season. Michigan

the trip by rail, by canoe, and then perhaps a tramp on foot into the heart of the wilderness. Then come the camp and its pleasant environments, and that lucky, radiant day when the early morning sun casts a glint upon the branching antlers of a mighty moose, as, half concealed in the thicket, he furtively and slowly browses his way along, the breathless wait until the neck or shoulder become exposed, the shot, and then—success—that is, sudden death; or perhaps success delightfully intensified by a hasty scramble after the mortally wounded beast on a blood-stained trail, at the end of which we triumphantly find our victim dead or dying.

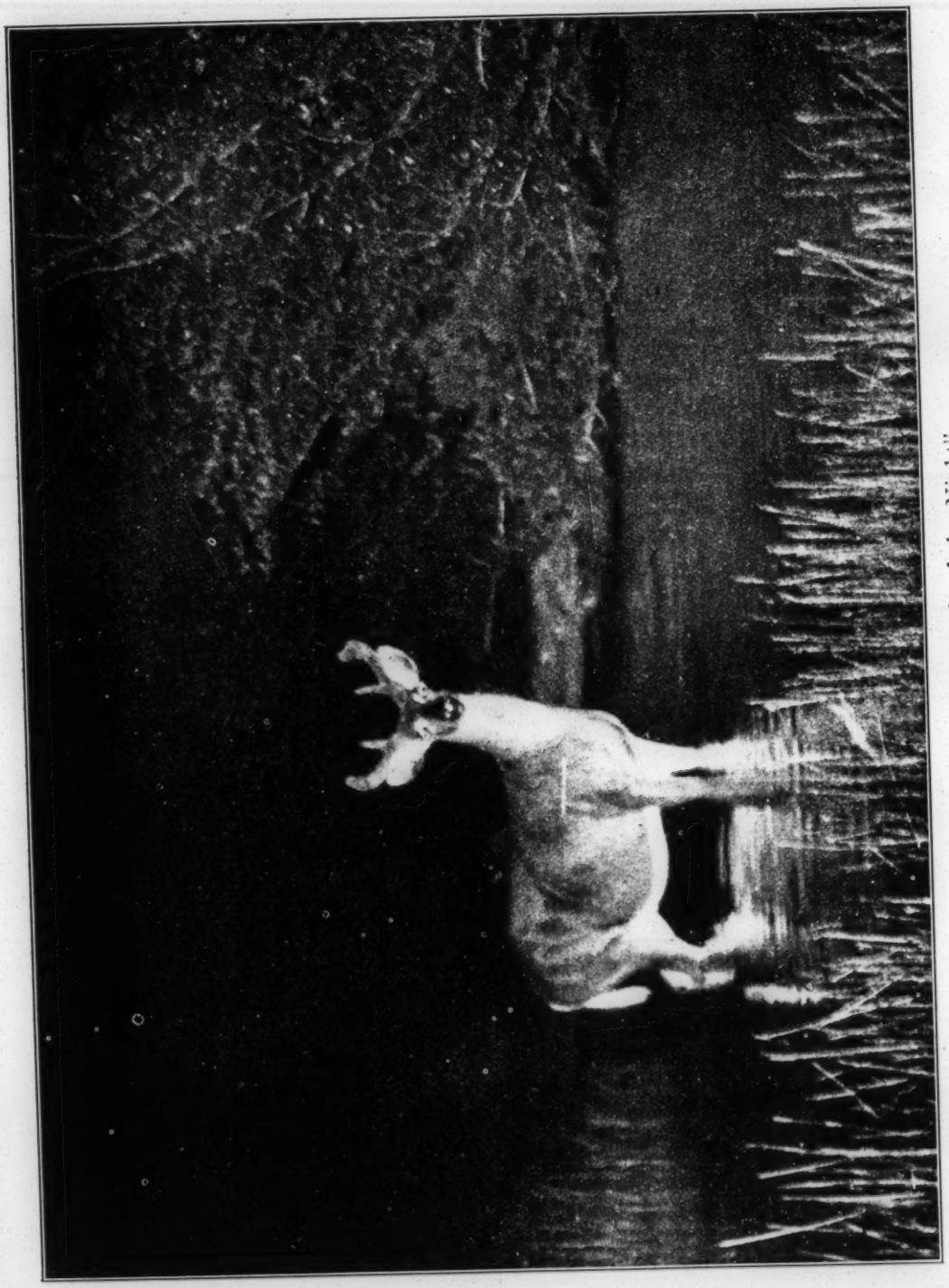
"Would that we could realize that what is game to the rifle is game to the camera! Every true sportsman will admit that the instant his noble quarry lies prone upon the earth, with the glaze of death upon the once lustrous eye, the graceful limbs stiff and rigid, and the tiny hole emitting the crimson thread of life, there comes the half-defined feeling of repentance and sorrow. The great desideratum, after all, consists of neither meat, nor horns, nor hide, for the very next day we may be at it again, if able to do so without too severe a tax on our conscience. Therefore we reach the conclusion that much of our large game, when skillfully hunted and dispatched by the modern sportsman

The Author's Camp

Situated in the wildest portion of Michigan, eight miles south of Lake Superior

of decent instincts, owes its extinction to an abnormal, if not fictitious, reason. Surely we do not travel a thousand miles, indifferent to time, labor, and expense, to get a few hundred pounds of wild meat, probably not half so toothsome as the domestic cuts in the market stalls of our own town or village, and costing frequently more than their weight in precious metal. Neither can hide nor antlers compensate us, except as visible evidence of our skill, for the taxidermist is ever ready to supply specimens of more surpassing beauty at half the cost. Some time we will come to recognize the fact that the real enjoyment of the outing in the woods or upon the water arises mainly in the freedom from business cares and the artificiality of city life, with the opportunity of indulging in some health-giving, exhilarating recreation, whatever name it goes under. This is especially true of the non-professional hunter of large game.

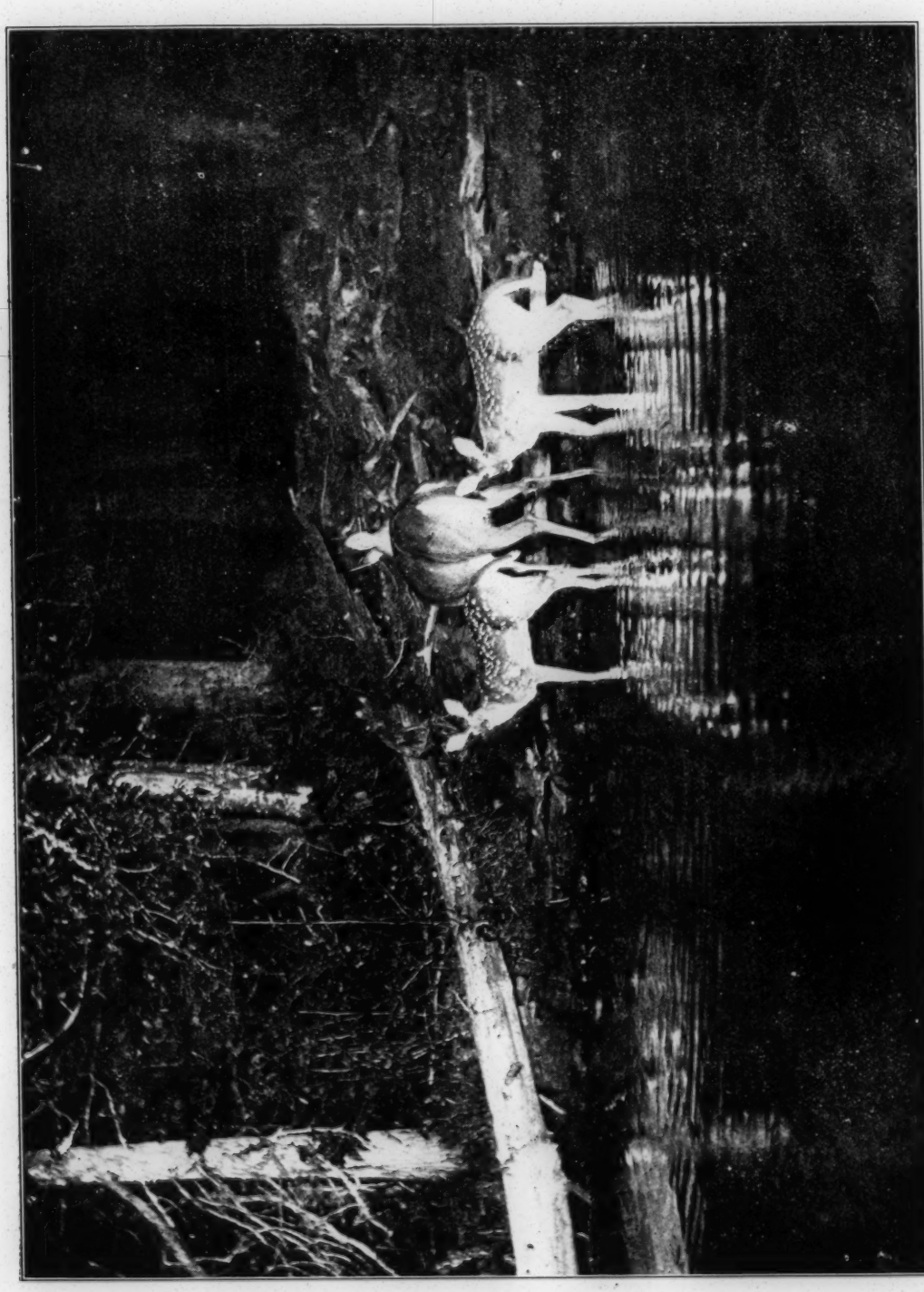
"We contentedly cast a fly all day into a swirling pool and may hardly get a bite, when a stick of dynamite would have covered the surface with a crate of trout or bass. We hopefully sit for hours shivering on the limb of a mountain oak and may contentedly return empty-handed, when the steel trap, staked pit, or set gun would have done the work equally well. The killing of large game becomes improvident, wasteful, and cruel whenever the amount shot exceeds the reasonable use for food. Many would exclaim that such a rule would put an end to every sportsman's camp; that perhaps the very first day luck would bless the greenhorn of the party with a fortuitous shot, and then the ten days' vacation would slowly elapse, while the rifles rested in the rack and the veterans sor-



Flashlight. "Monarch of the Night"
Lower White Fish River

Flashlight. Deer and Porcupine

White Fish Lake. Latter not noticed until after the flash was fired



Flashlight: "Innocents Abroad." Doe and Twin Fawns
White Fish Lake. Author was ten years trying to photograph a fawn in the spotted coat

Flashlight. Spike Horn Buck

White Fish River. Photographed at only ten feet, as deer left reeds to enter river

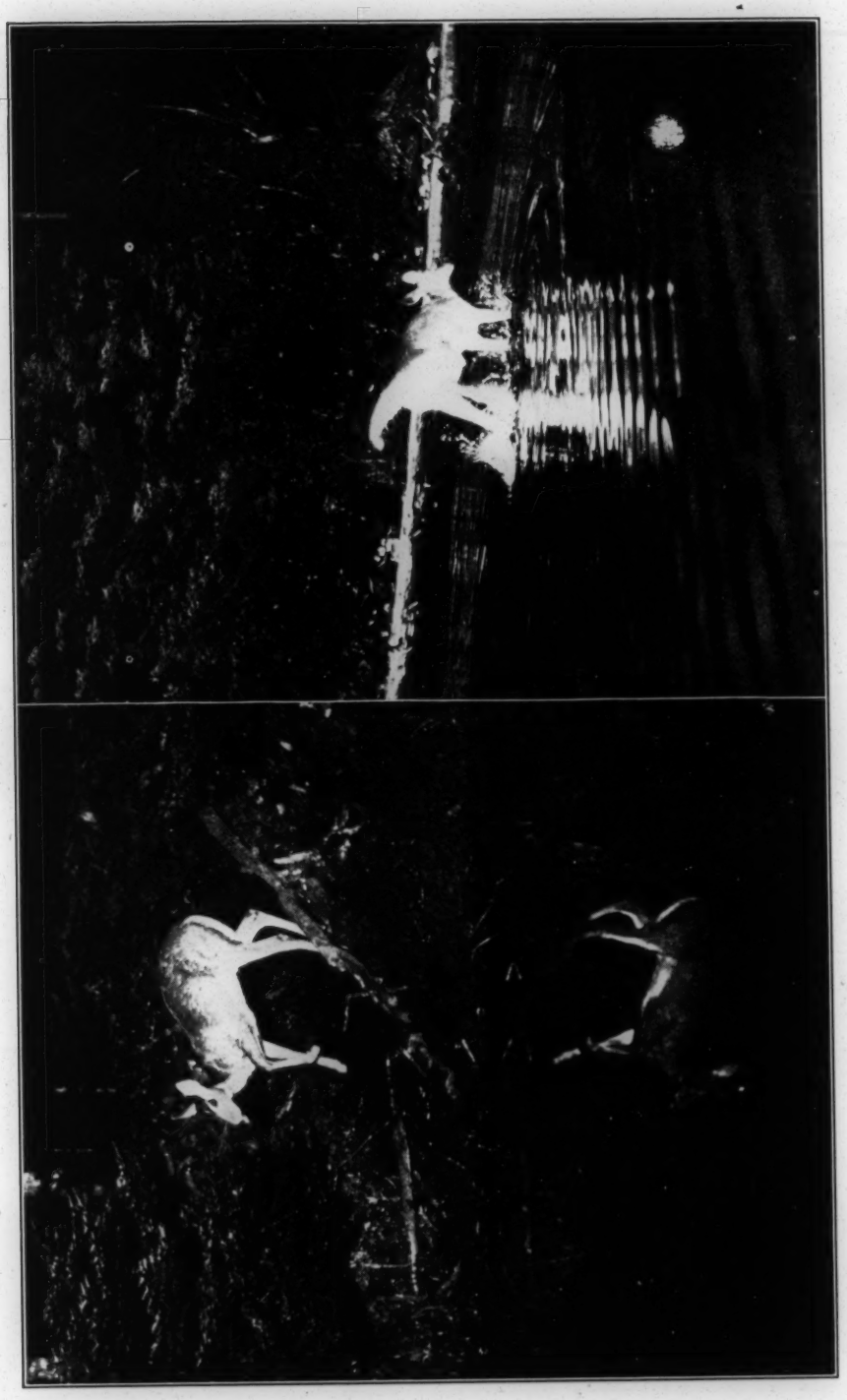
Flashlight. A Victim of the Gray Wolves Killed on the Verge of Safety

White Fish Lake

rowfully gorged themselves on musty buck until the time arrived to pull up stakes, pack the duffle, and depart for civilization. This may be true, so far as it relates to the cylinder of steel. Just substitute the camera gun, with its accurate tube of brass, and you are again equipped for sport. The game bag is never full, one's pleasures never satiated.

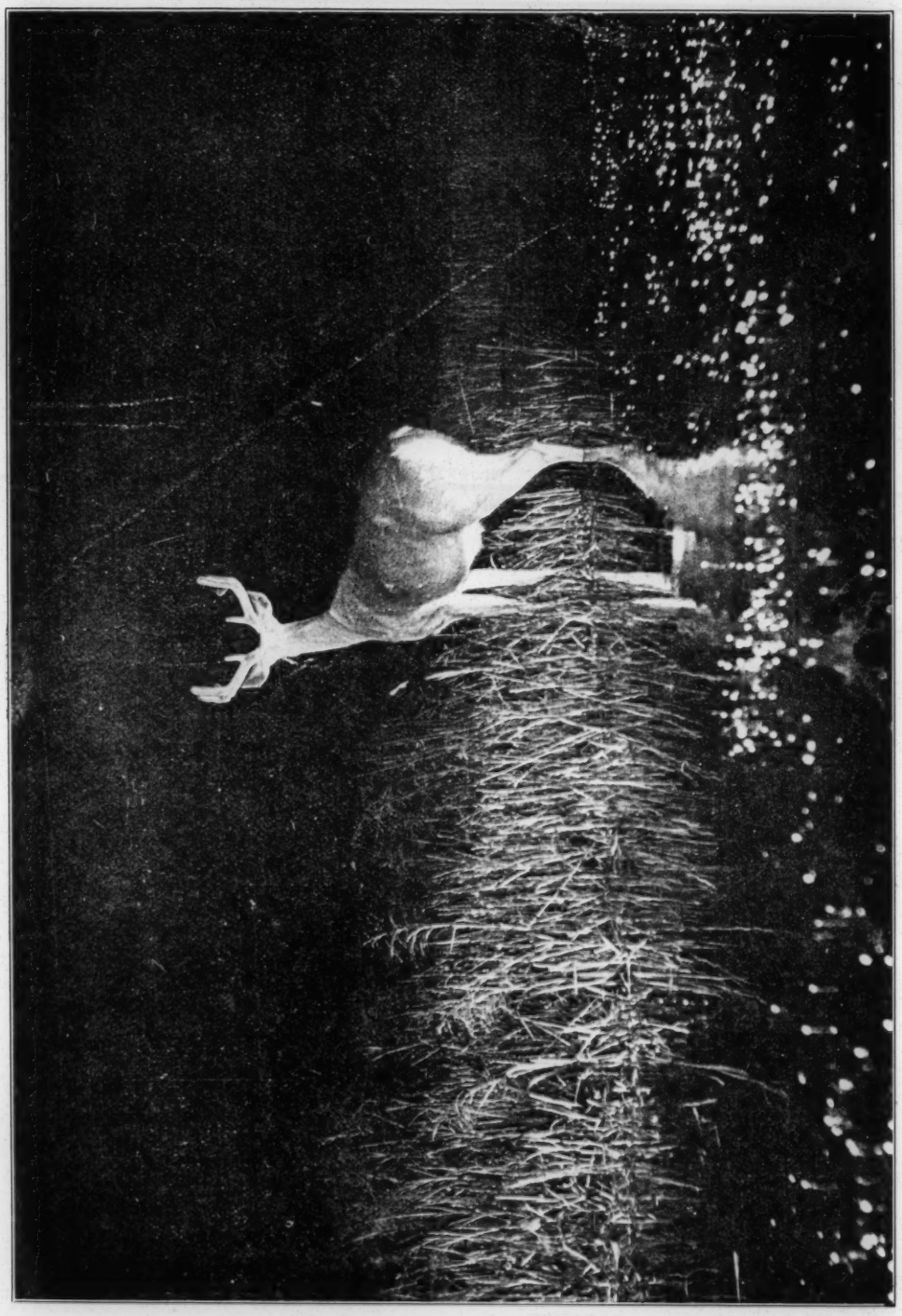
"Every camera hunter must admit that more immediate and lasting pleasure is afforded in raking a running deer from stem to stern, at twenty yards, with his 5 x 7 bore camera than driving an ounce ball through its heart at 100 yards. Then think of the unlimited freedom of this noiseless weapon. No closed season, no restriction in numbers or methods of transportation, no posted land, no professional etiquette in the manner of taking your game, but you can pull on a swimming deer or an elk floundering in the snow, take a crack at a spotted fawn, bag the bird on its nest, or string your cameras out like traps with a thread across the runway and gather in the exposed game-laden plates at nightfall without any scruples about being called a pot hunter or a game hog.

"While it is true that whatever is game to the gun is game to the camera, it must be particularly noted that the latter's field is much enlarged by the immense variety of birds, animals, and reptiles which are never considered fair prey for the huntsman. Game in the early days was declared to be only such as was edible, and this standard exists at the present time, though certain predatory animals and those possessing handsome pelts have at times been pursued by sportsmen in the vain effort to broaden the ever-narrowing sphere of their activity. Non-game birds and animals outnumber the edible class a thousand times, and it is this great advantage which makes and will continue to make camera hunting the more attractive and permanent of the two methods of



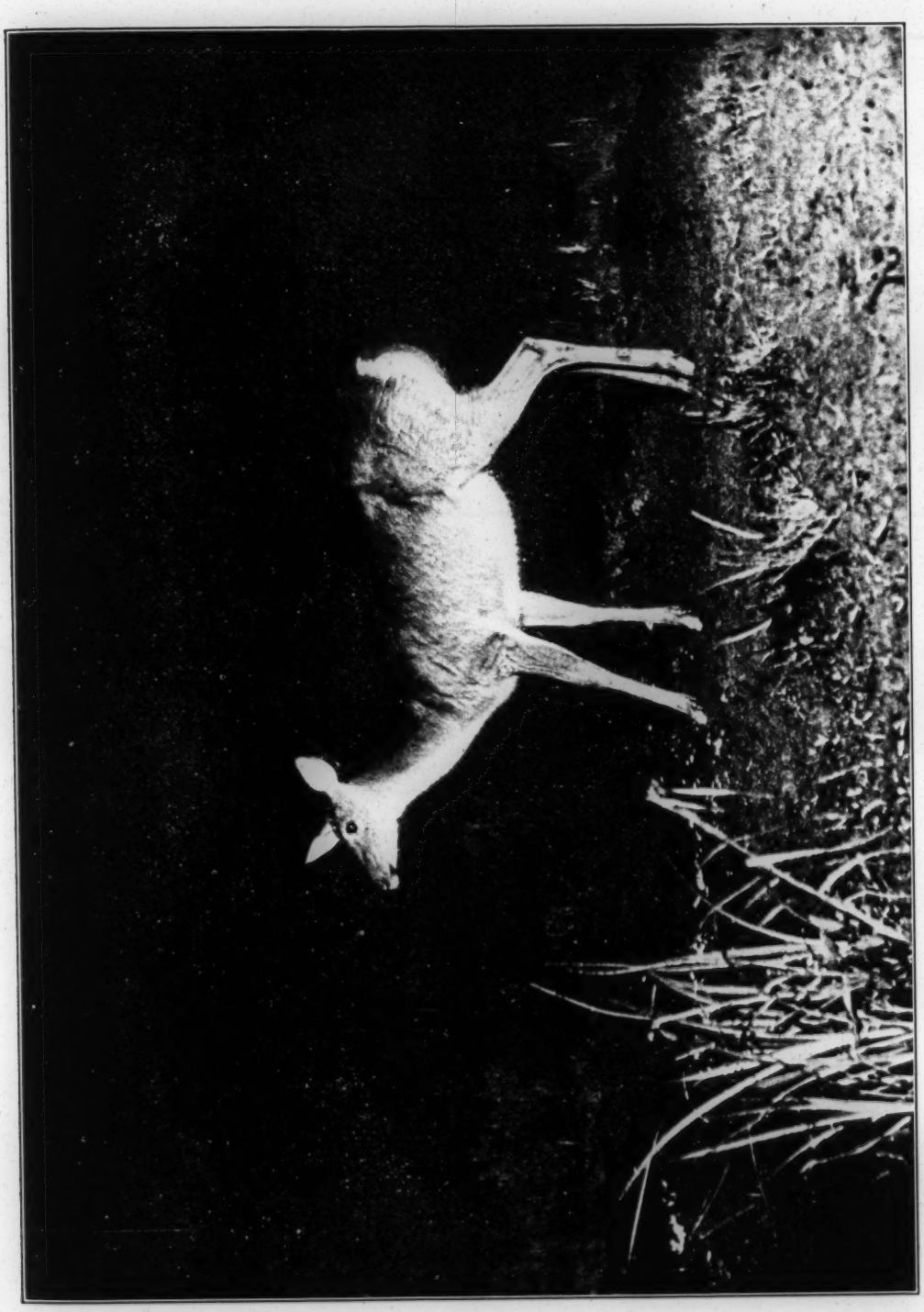
Flashlight. Lake Matagamasing, Canada. Caught on the Jump

Lake Dewdney, Canada



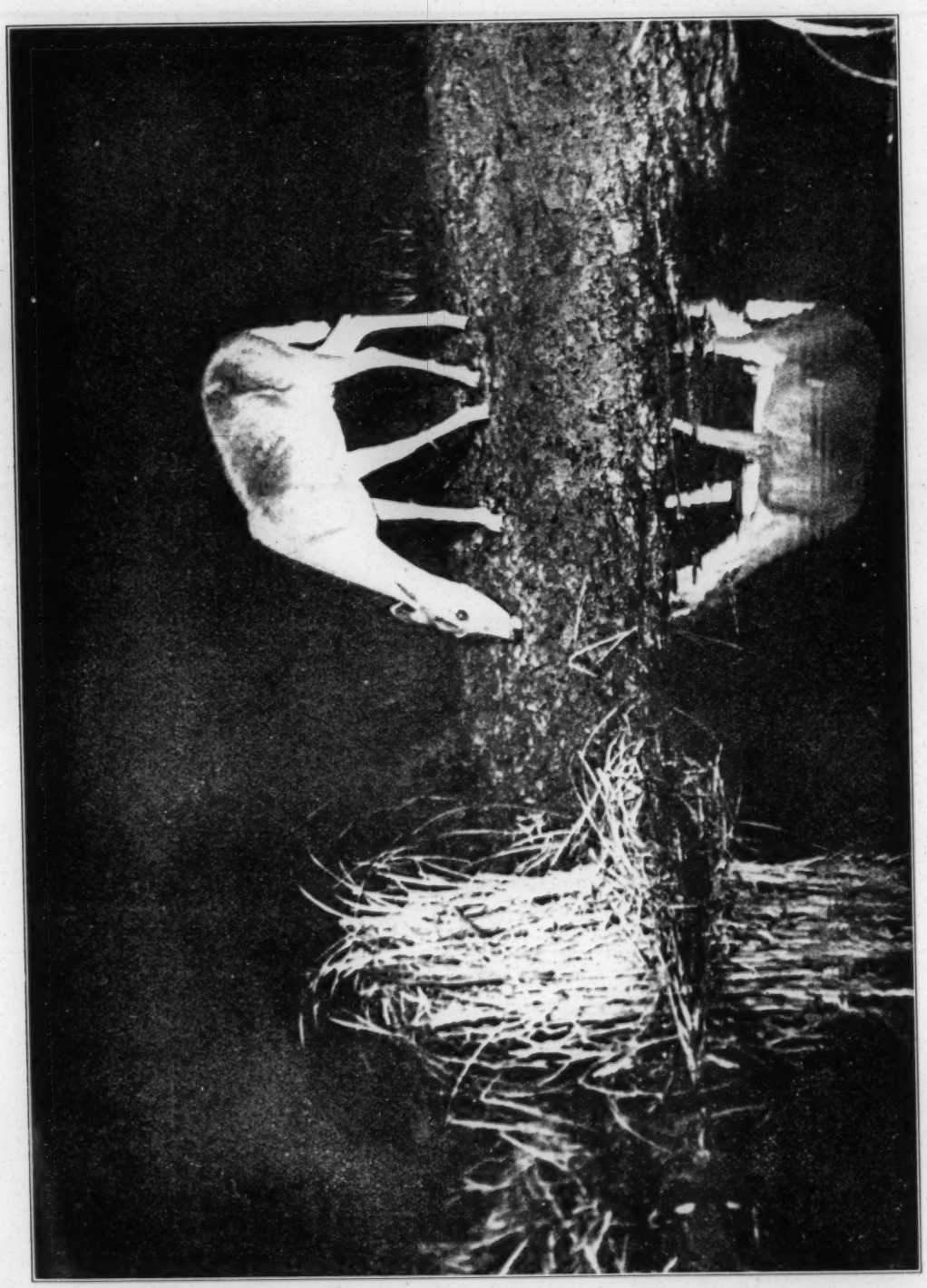
Flashlight. "Hark!"

Large buck in slough, watching fluttering light of the jack on bushes beyond. Upper Michigan



Flashlight. Doe

With ears set either way and tail drawn in, it timidly watches the approaching light. Howe's Lake, Michigan

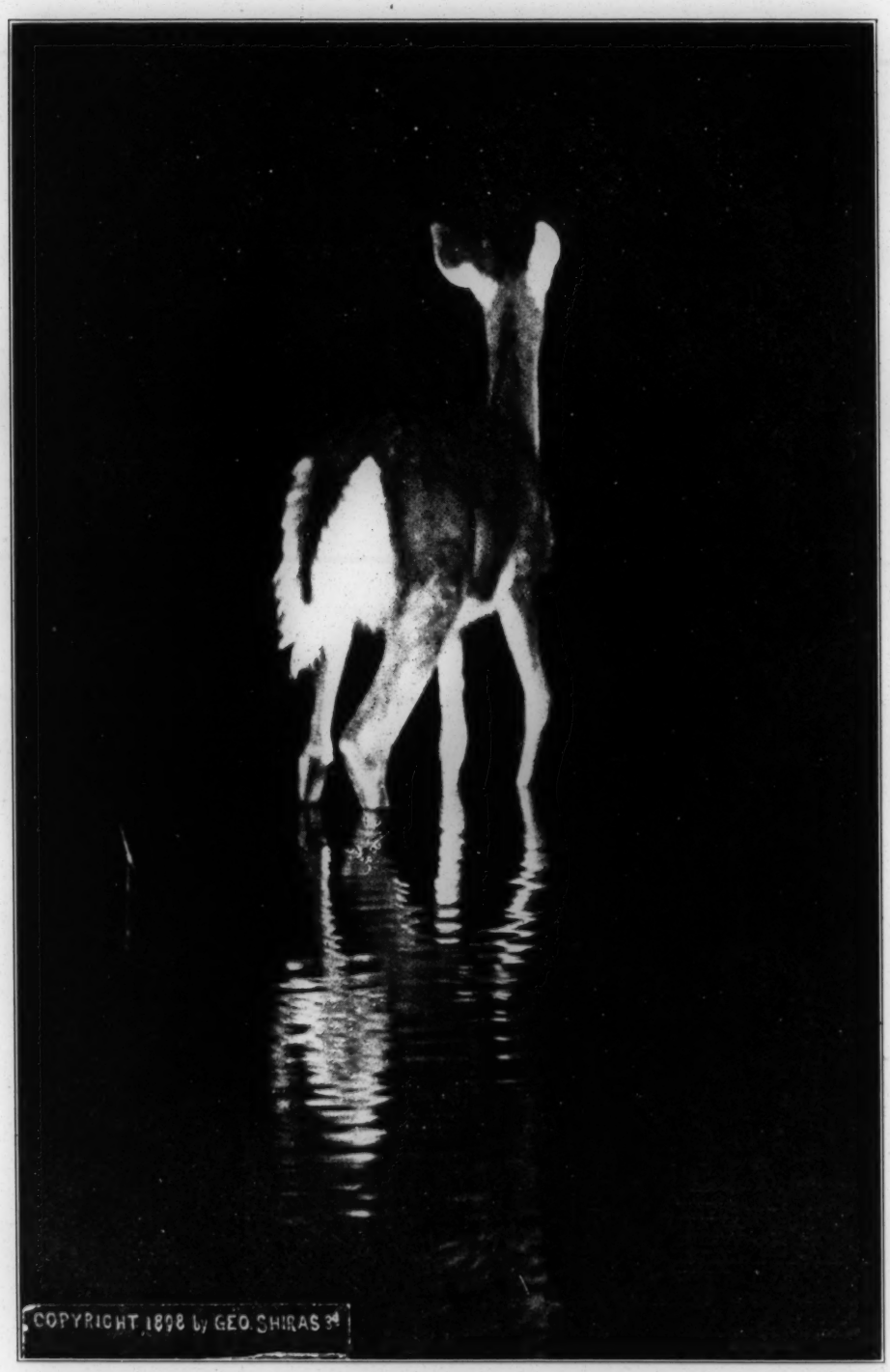


Flashlight. "Midnight Reflections"

Utterly oblivious to the jack light, it presented a beautiful picture preceding the flash.
Pond south of Lake Superior

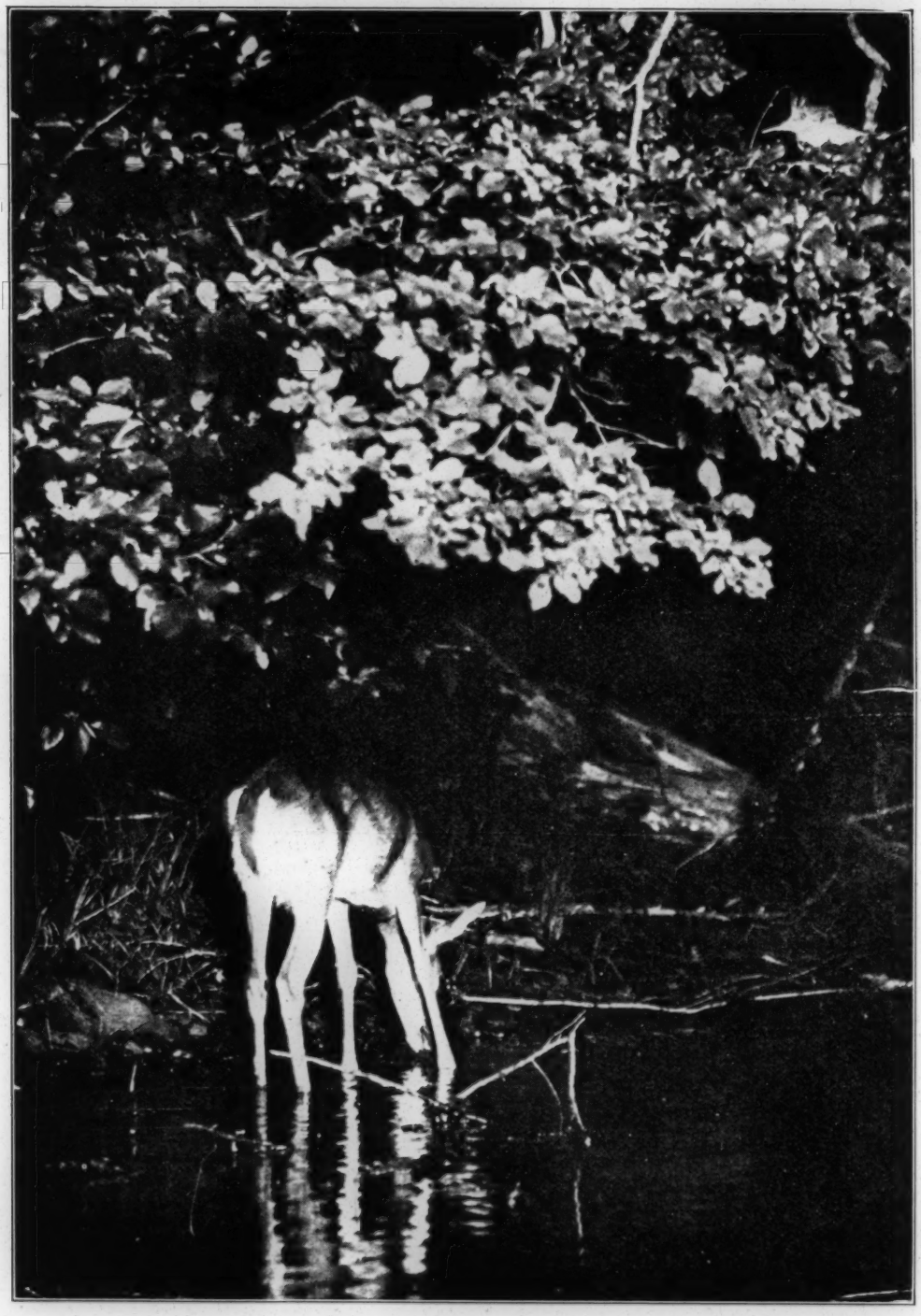
Flashlight. "Has He Gun or Camera?"

Large buck pictured when stopping momentarily to watch the jack light. La Pete's Slough, Upper Michigan



Flashlight. "A Midnight Wader"

Yearling buck, showing the large white tail, which gives this deer its name. Pictured in shallow water fifty yards from shore



Flashlight. Doe

Bear Bay, near Lake Superior. Note kingfisher asleep in upper right hand.

Flashlight. Porcupine Invades Houseboat

White Fish Lake. Flash fired as animal starts for gang plank

pursuing wild life, and at the same time largely counterbalance the greater difficulty of photographing birds or animals when compared with the ease of shooting the same under similar circumstances; for the difference between stalking within rifle range of a moose, a deer, or a bear and getting within a few yards of the same, in broad daylight, with the camera, need not be pointed out. The restrictions upon the gun which prevent the sportsman hunting the golden eagle, the snowy owl, the graceful flamingo, the gulls, herons, hawks, and those hundreds upon hundreds of birds, varying from the tiny humming bird to the mighty condor, do not apply to the man with the camera or prevent him from picturing the myriads of animal life, wherein the porcupine, the wild cat, the coon, the wolf, the alligator, or the sea-lion may be considered the fairest and most attractive kind of game, because requiring the same skill and the same patience which leads the sportsman to pursue to the death those varieties of animals which a fictitious reason allows them to kill for sport, under the assumption that their edible qualities is a justification.

"It is only within the last few years that compact photographic appliances, quick shutters, rapid dry plates and films have made possible successful work on large game, or otherwise some of us might have reformed before. The longer we have hunted and the greater our success, the less able are we in after years to recall many of such scenes with satisfactory distinctness. We have taken too many mental photographs, so that our gray film fails to be clearly and permanently impressed with the thousand

scenes of slaughter the eye has successfully focused. Not so with the camera hunter. Each year adds value to his successful shots, and when he departs for the happy hunting grounds his works live on forever.

"Generally speaking, it is a patent fact that in the more remote portions of our country the largest of the great game fall singly and in bands without any pretense that the meat itself can be possibly used, and this is especially true of the moose, elk, caribou, and formerly of the buffalo. In many instances the horns and hide become a handsome trophy, but at a cost far exceeding their commercial value. Wherefore this anomalous state of affairs?

"If the incentive pulling the trigger is the flesh pot or the purse, the case is incurable. To the professional hunter the camera would be a hollow mockery, and a plate containing the image of a deer instead of a solid chunk of venison a Barmecidal feast. Killing game by the professional is purely a matter of business, like cutting cordwood, and therefore gauged upon a different, but nevertheless much more rational, principle than the one which governs most of us in hunting."

The above plea for the camera in hunting has since been supplemented by many other sportsmen and naturalists, until, at the present time, hardly a month goes by that some new and forcible reason is not given for the substitution of the camera for the gun.

While a number of the present illustrations were taken in the daytime, this method of photography is now so well known that I will not attempt to describe such pictures in detail; but in view of the fact that I was the first to attempt flash-light pictures of wild game, and for the first fifteen years was the sole occupant of this attractive field of photography, it may be of interest to the readers of this article to learn something about this rather odd way of picturing wild animals, at a time when the hunter ordinarily is sound asleep.

When going out for the first time in the dead of night, in the silent, trackless forest, or upon the placid bosom of some little lake, searching for game photographs, with the way feebly lighted by a bull's-eye lantern on one's head, or the lamp fastened to a stick in the bow of a frail canoe, one is apt to think it is a venture unlikely to meet with much success, however great the novelty of such an expedition.

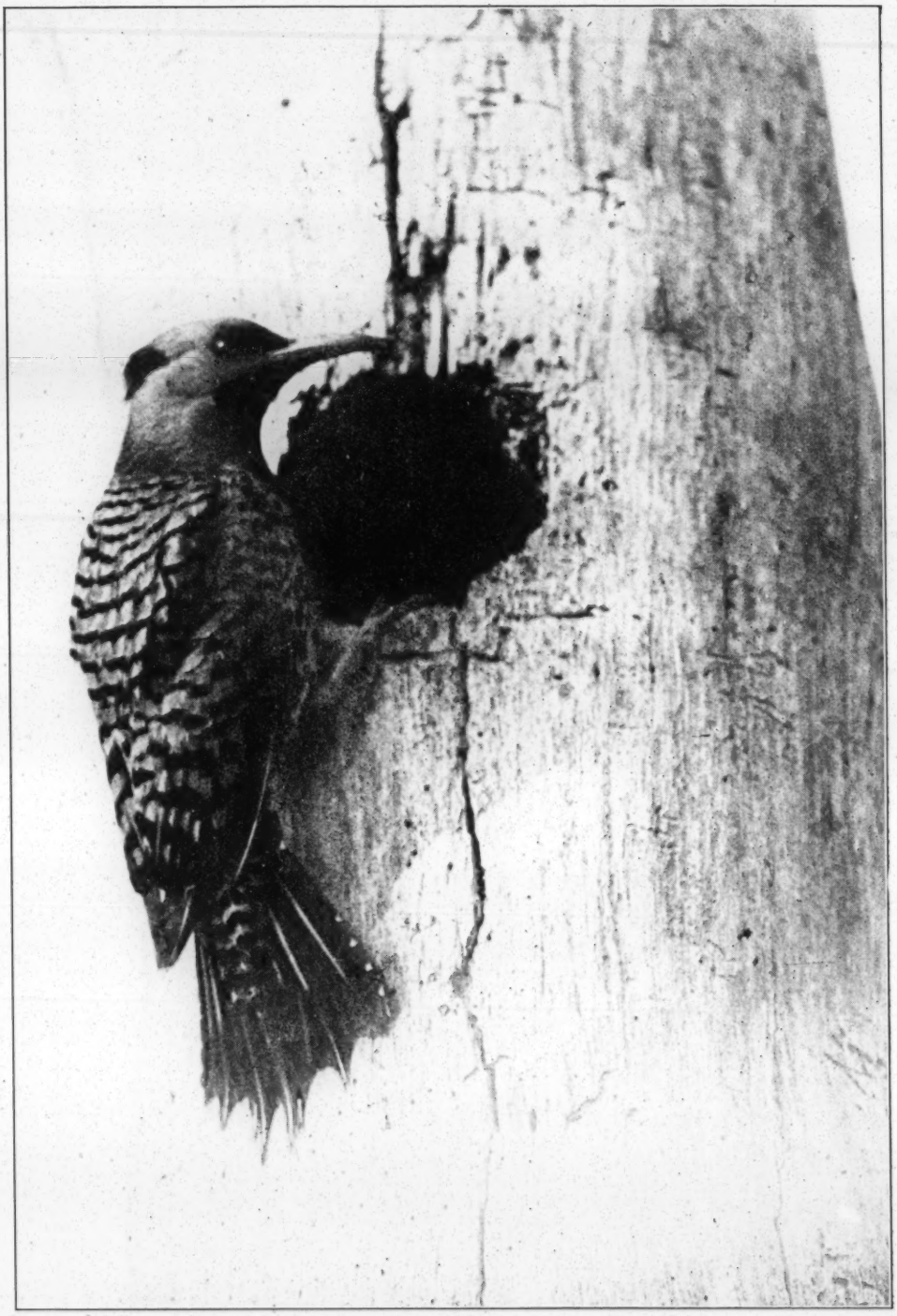
However, the pictures herein produced are but a few of the many obtained in the past, and indicate that night hunting with the camera, while of course difficult, is still not barren of results.

Like all pastimes worthy of permanent existence, considerable skill and patience is required, doubly rewarded, first by the fascination of life amid Nature's secret haunts, and secondly in the beautiful and permanent game pictures which the camera hunter obtains when his efforts are properly directed.

A brief description of how these night pictures were taken may not be out of place. Ordinarily it is preferable to seek the game along the water-courses, and, as most wild game are largely nocturnal in their habits, the writer has usually sought his game in a boat rigged especially for such purpose.

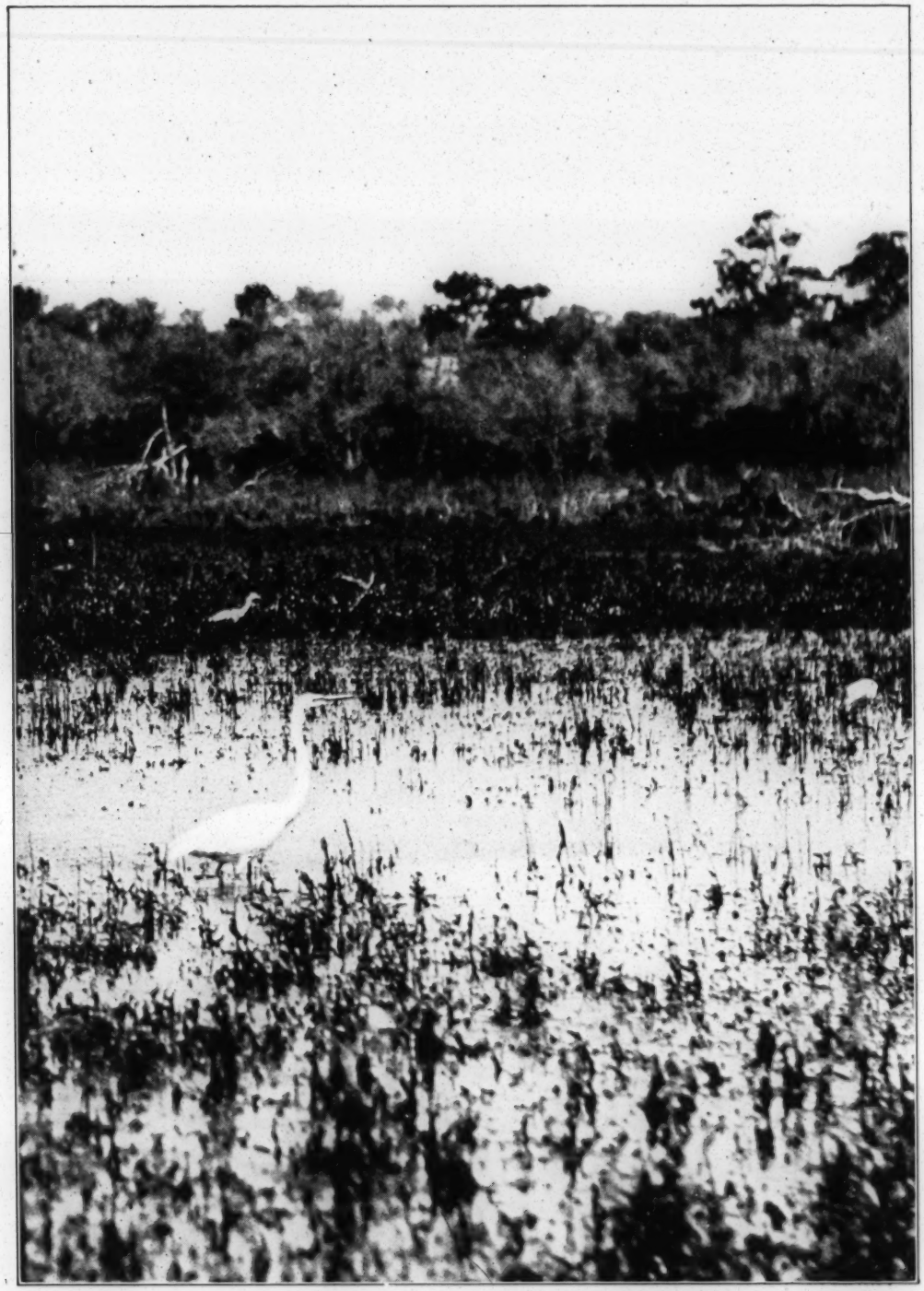
In the bow of a light fourteen-foot boat is set a frame upon which two cameras are placed, focused at from thirty to forty feet; above this is placed a lamp with a strong reflector, which throws the rays directly in front of the boat.

The deer and the moose feed among the lily pads and grasses along the edge of the stream or lake. They are not ordinarily frightened by the approach of a light, their curiosity being very strong and the bright rays of the lamp blinding them, so that they cannot see the boat or its occupants. This method of approaching game is well known to hunters, and is called "hunting with a jack-light." It has been the subject of some discussion among the sportsmen as to whether this method is legitimate, nearly all contending that it does not give the deer a chance for his life, which true sport demands.



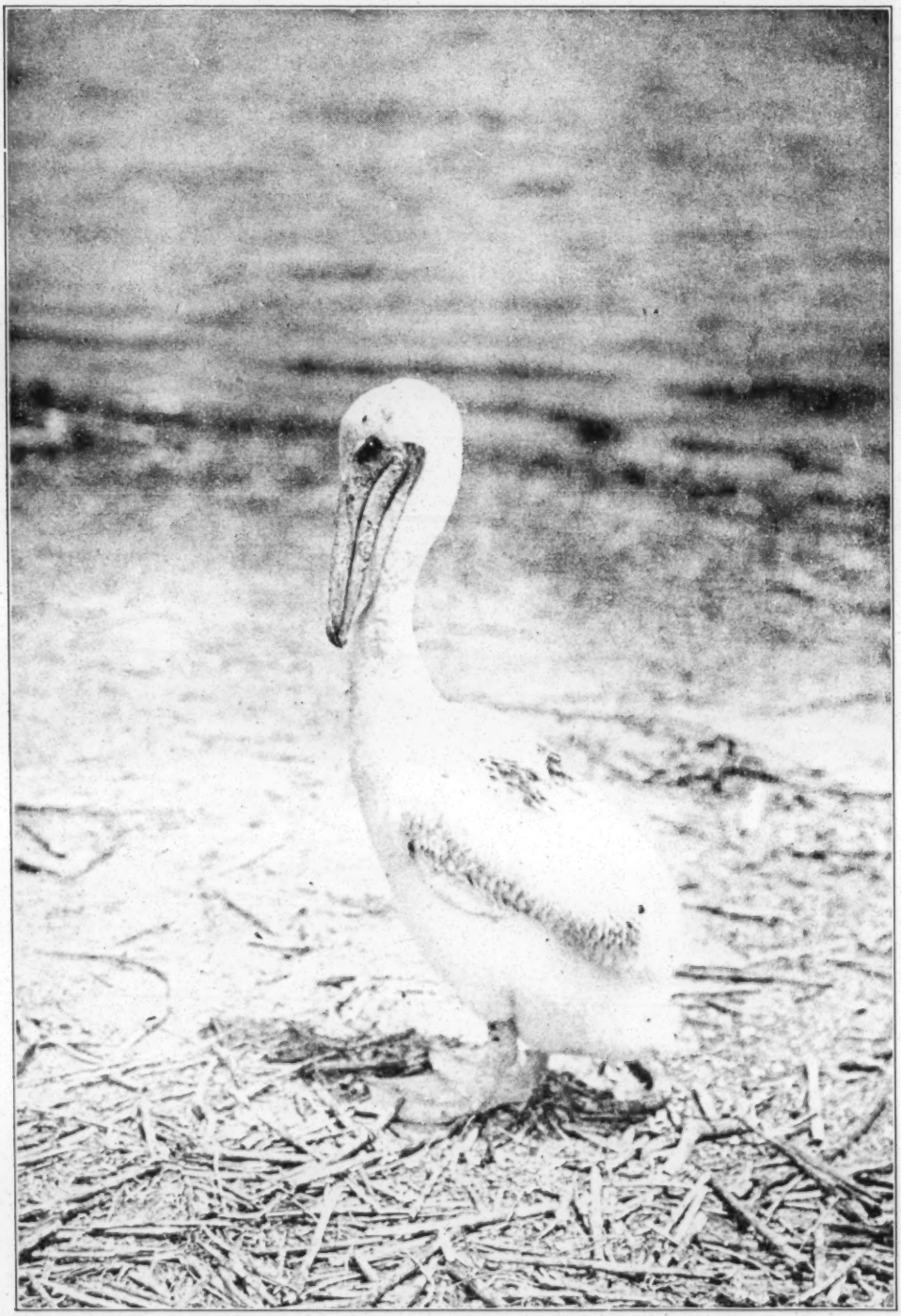
Yellow Hammer or Flicker at Nesting Hole

Revell's Island, Virginia. The picture was taken with a portrait lense, the camera being concealed in a bush, four feet away, while the author, 20 yards distant, pulled the string



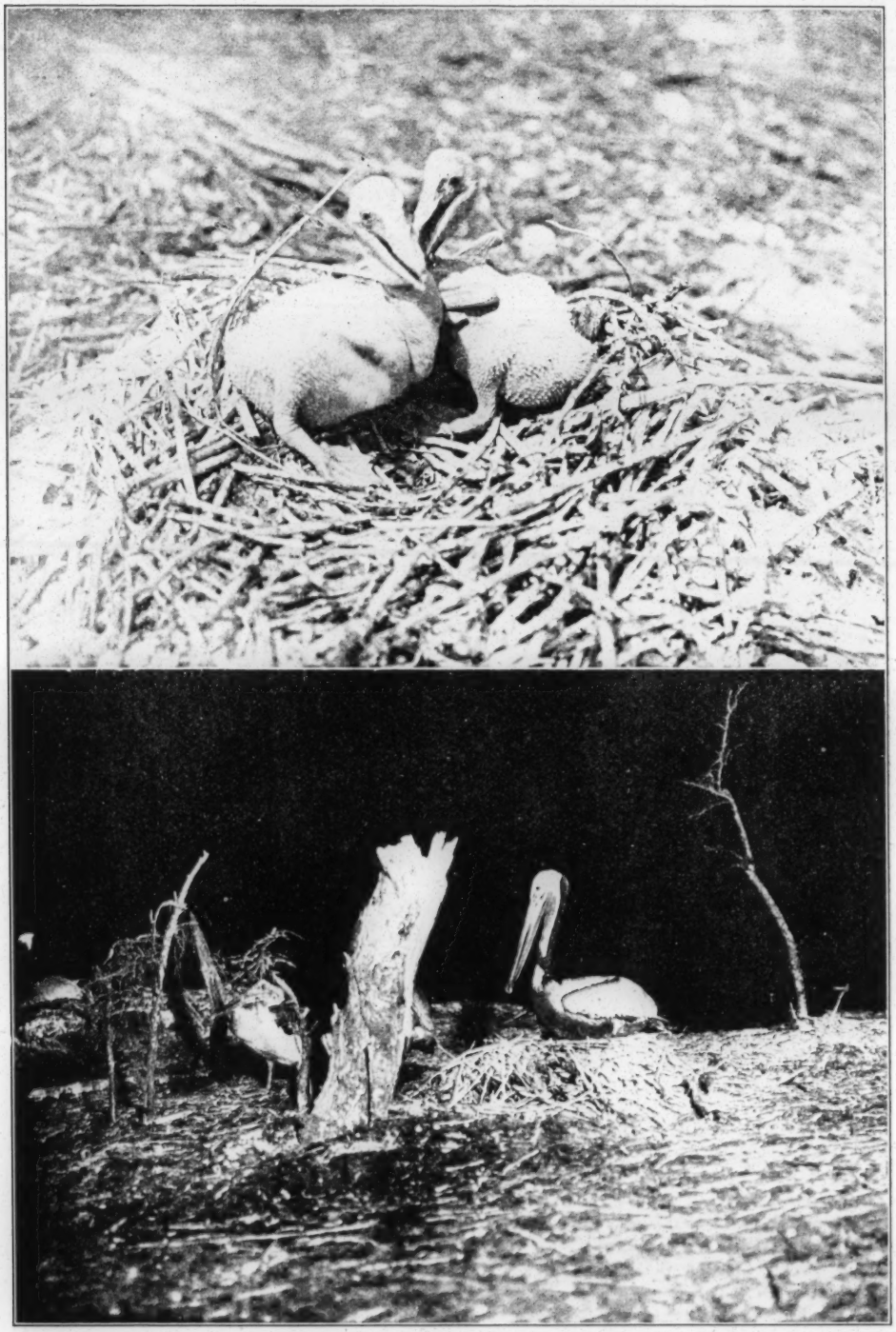
The Great White Heron

Brackish pond, Cumberland Island, Georgia. This bird is nearly extinct in North America

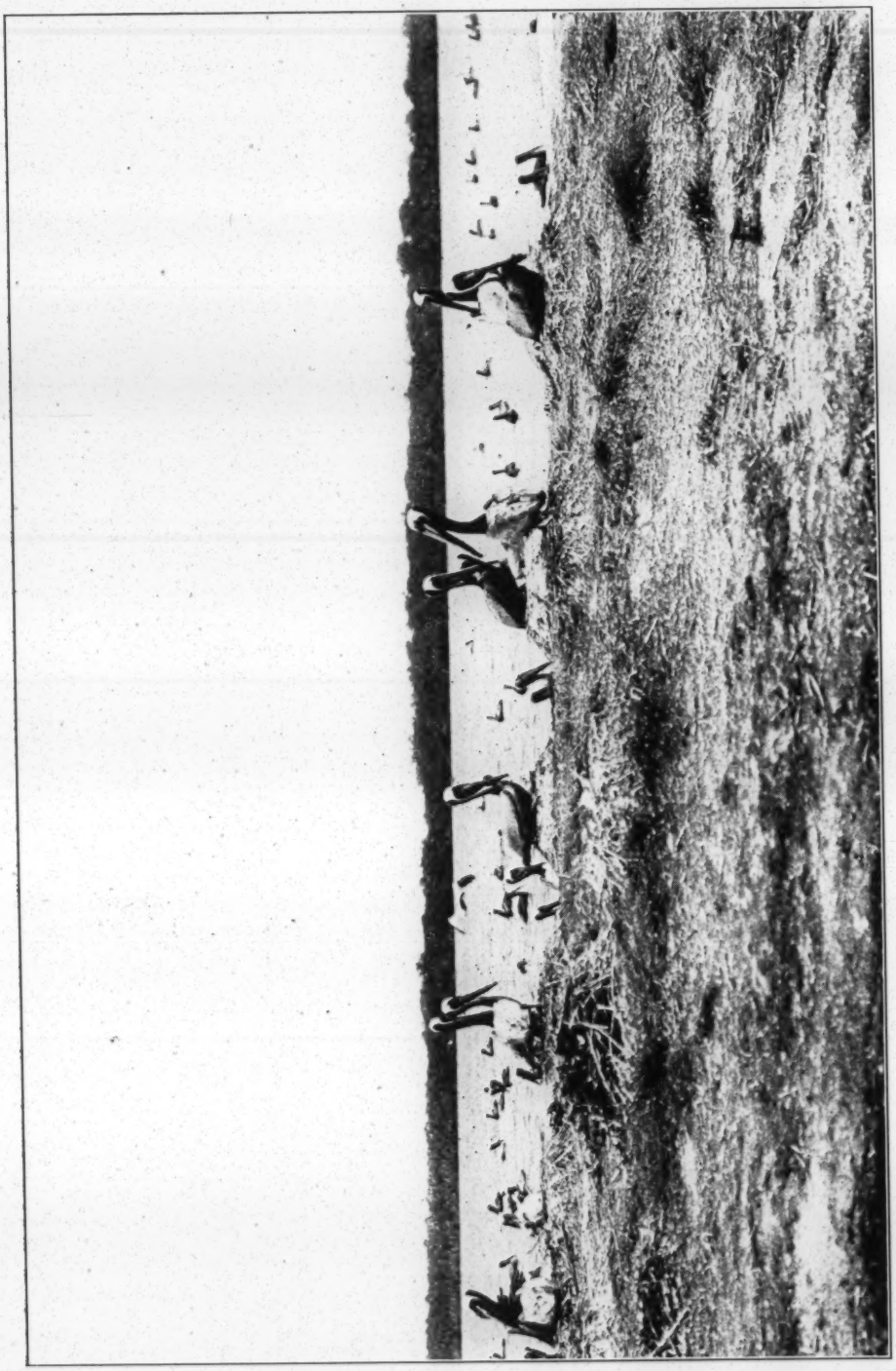


"Dignity Personified"

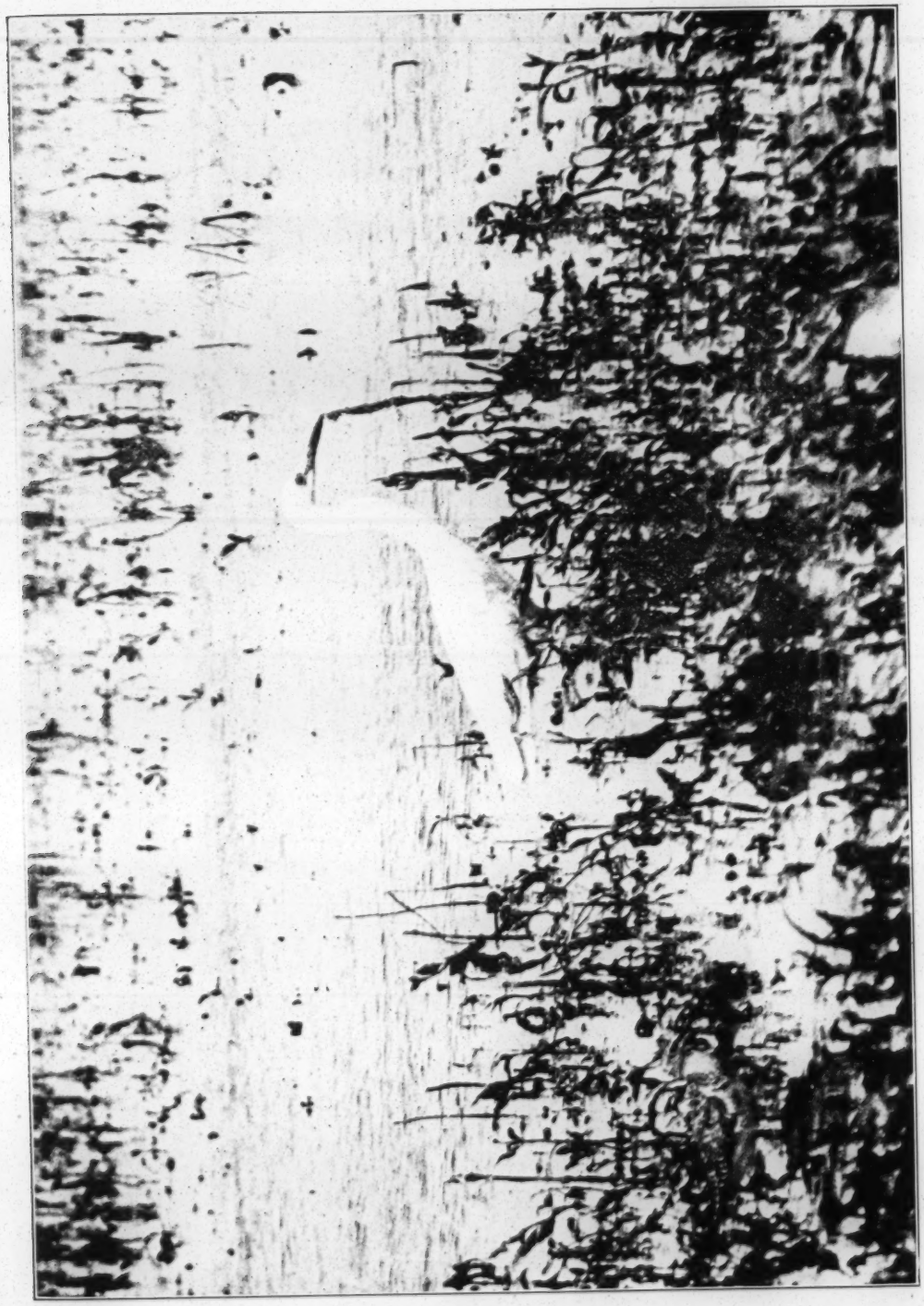
Young brown Pelican in downy stage. Indian River, Florida



Young Pelicans protesting against the Camera. Flashlight of Pelican on Nest



Pelican Island, Indian River, Florida, during the Nesting Season

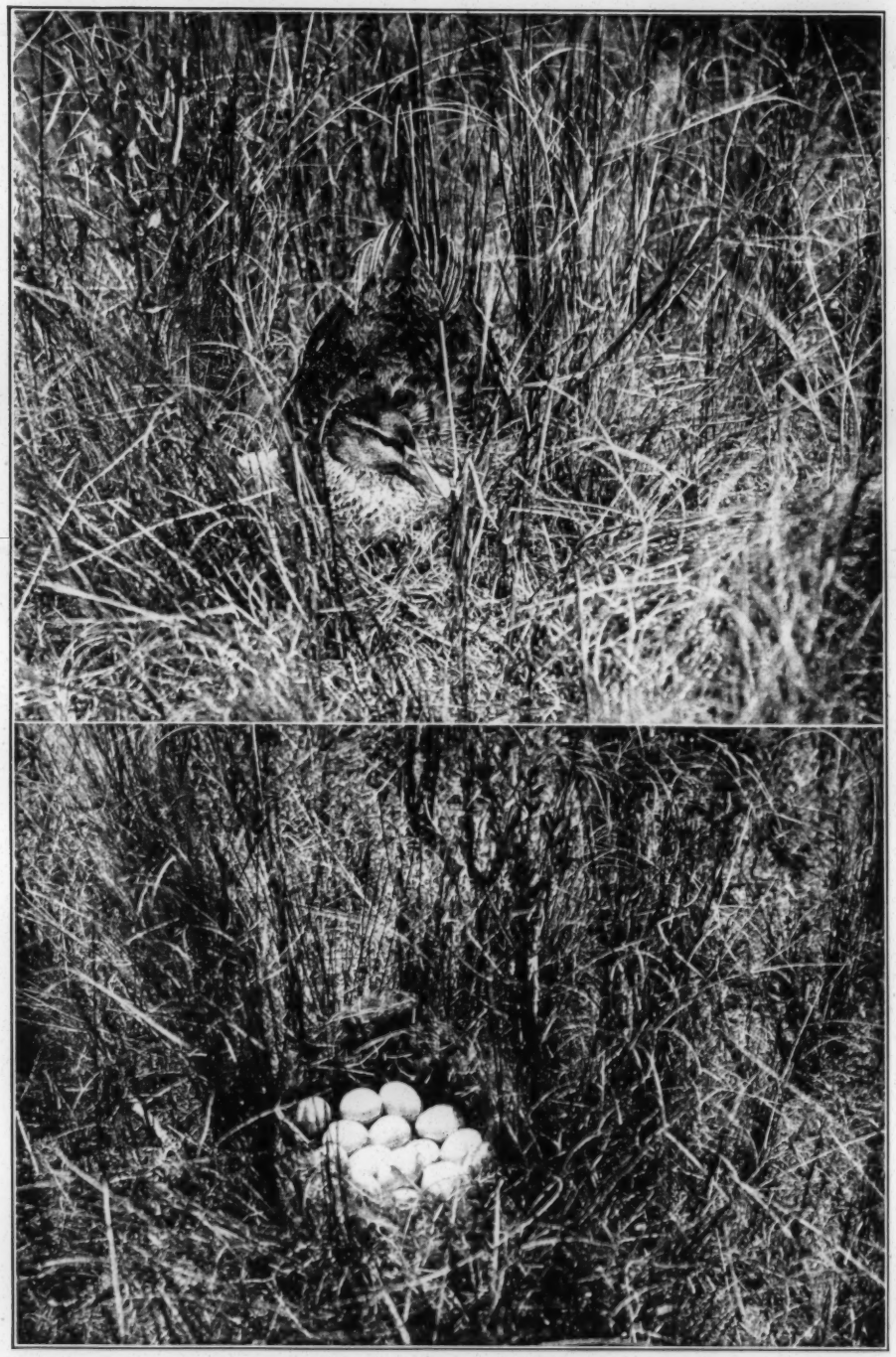


The Little Blue Heron in the White or Immature Stage

Cumberland Island, Georgia. Note the yellow-leg plover in left-hand corner

Osprey or Fish Hawk Flying over Nest

Eastern shore of Virginia

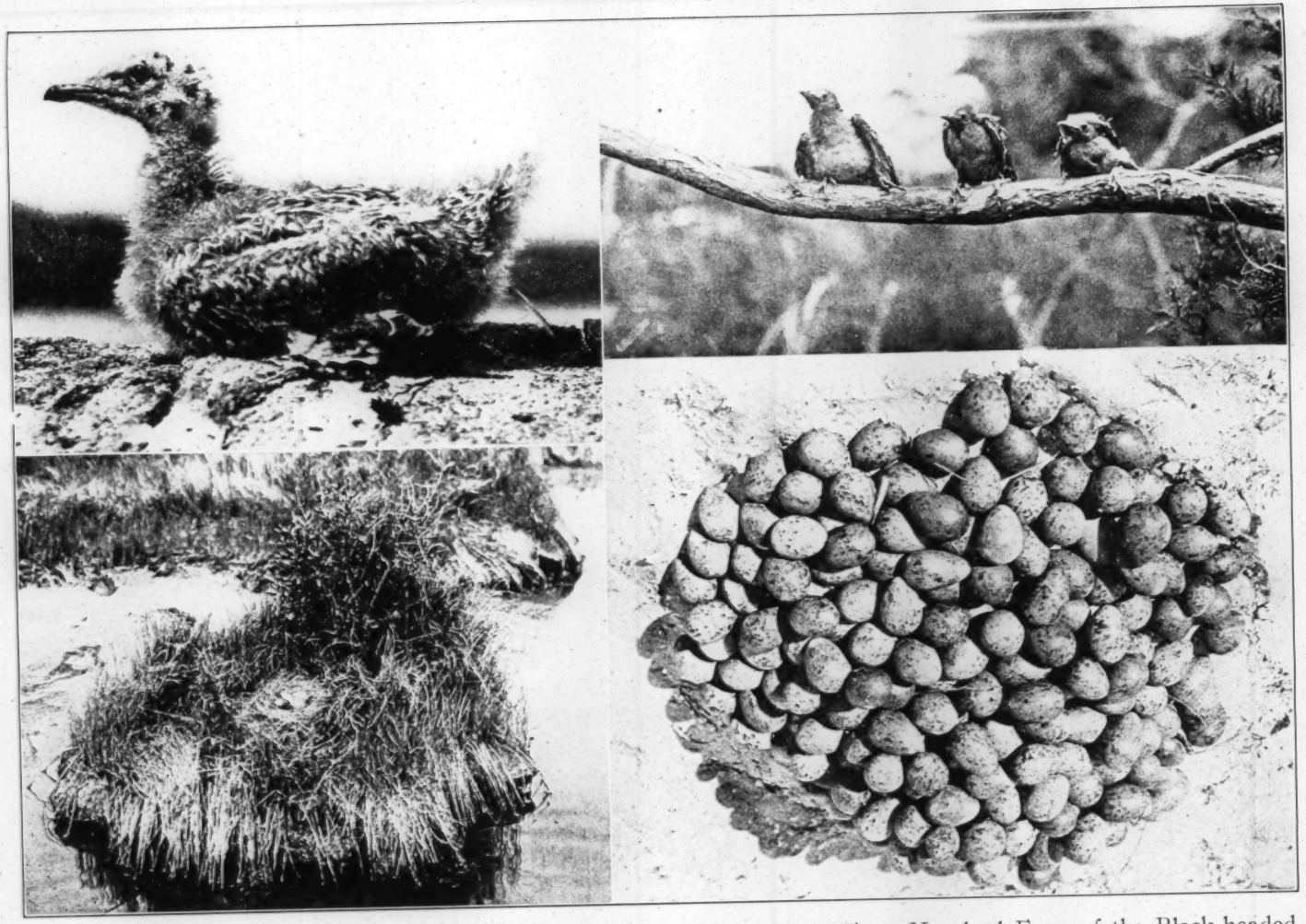


Mallard Duck on Nest. Mallard Duck Nest with 14 Eggs

Northern Michigan

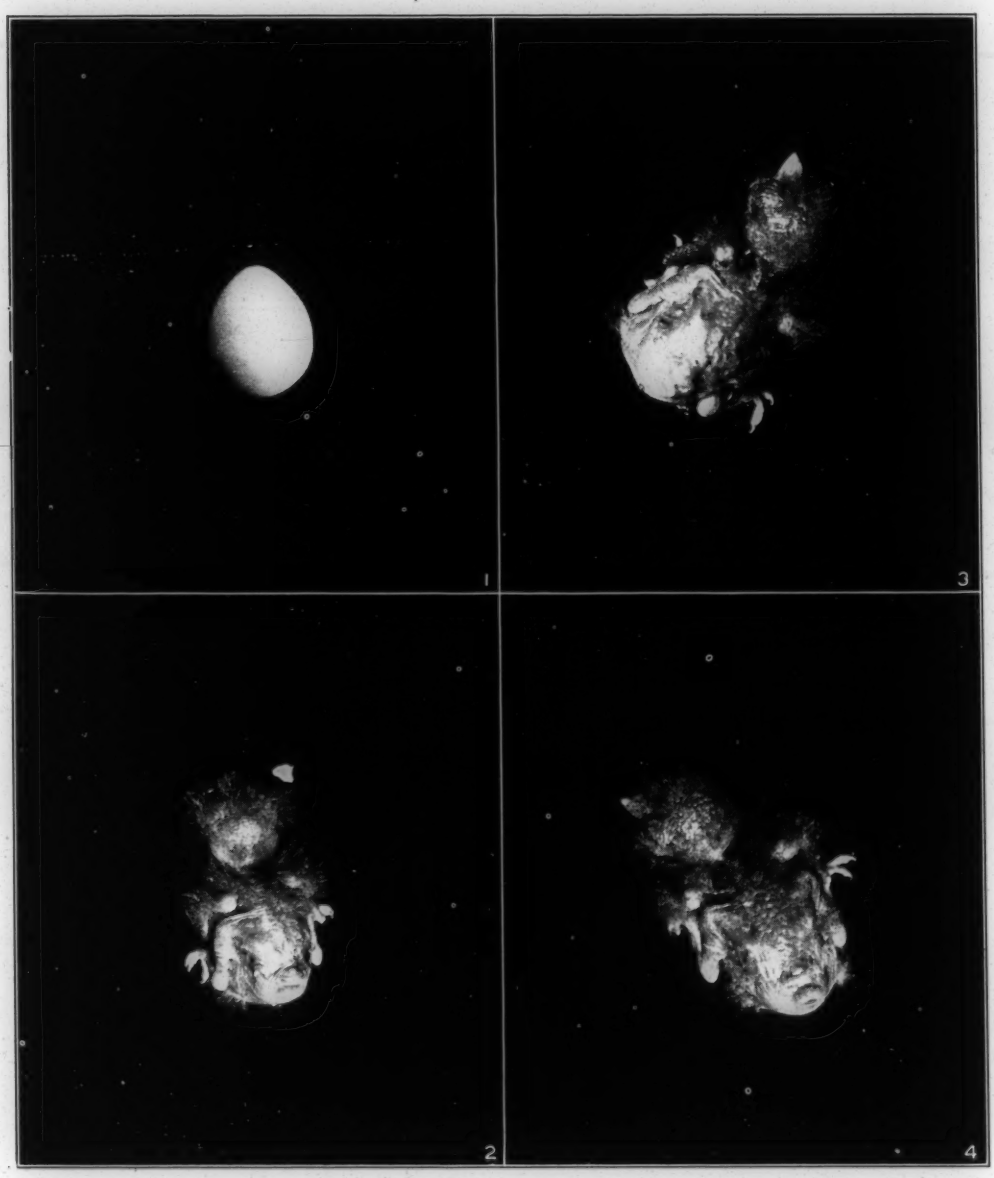
Eggs of the Herring Gull Just Hatching. Young Herring Gull Out of the Shell Five Minutes.

Gull Island, Lake Superior



Young Herring Gull. Young Crow Blackbirds. Willett Snipe's Nest. Four Hundred Eggs of the Black-headed Gull collected in two hours

Eastern shore of Virginia. A form of pillage which the Audubon Society has nearly stopped

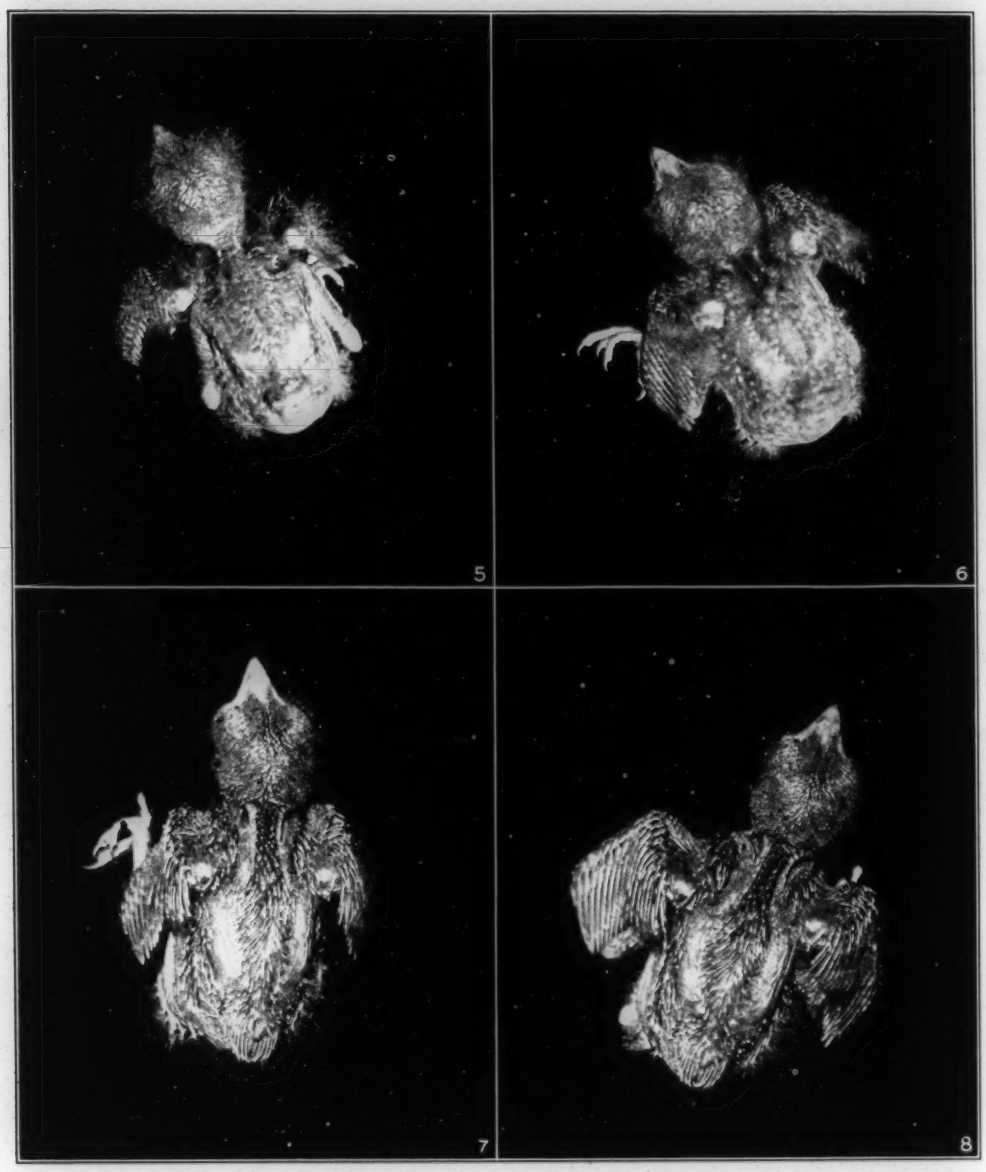


The Egg of a Phœbe (Flycatcher) and seven consecutive days' growth of young (life size)

Alger County, Michigan

That, however, is a question which does not concern us at present, as our hunting is not destructive.

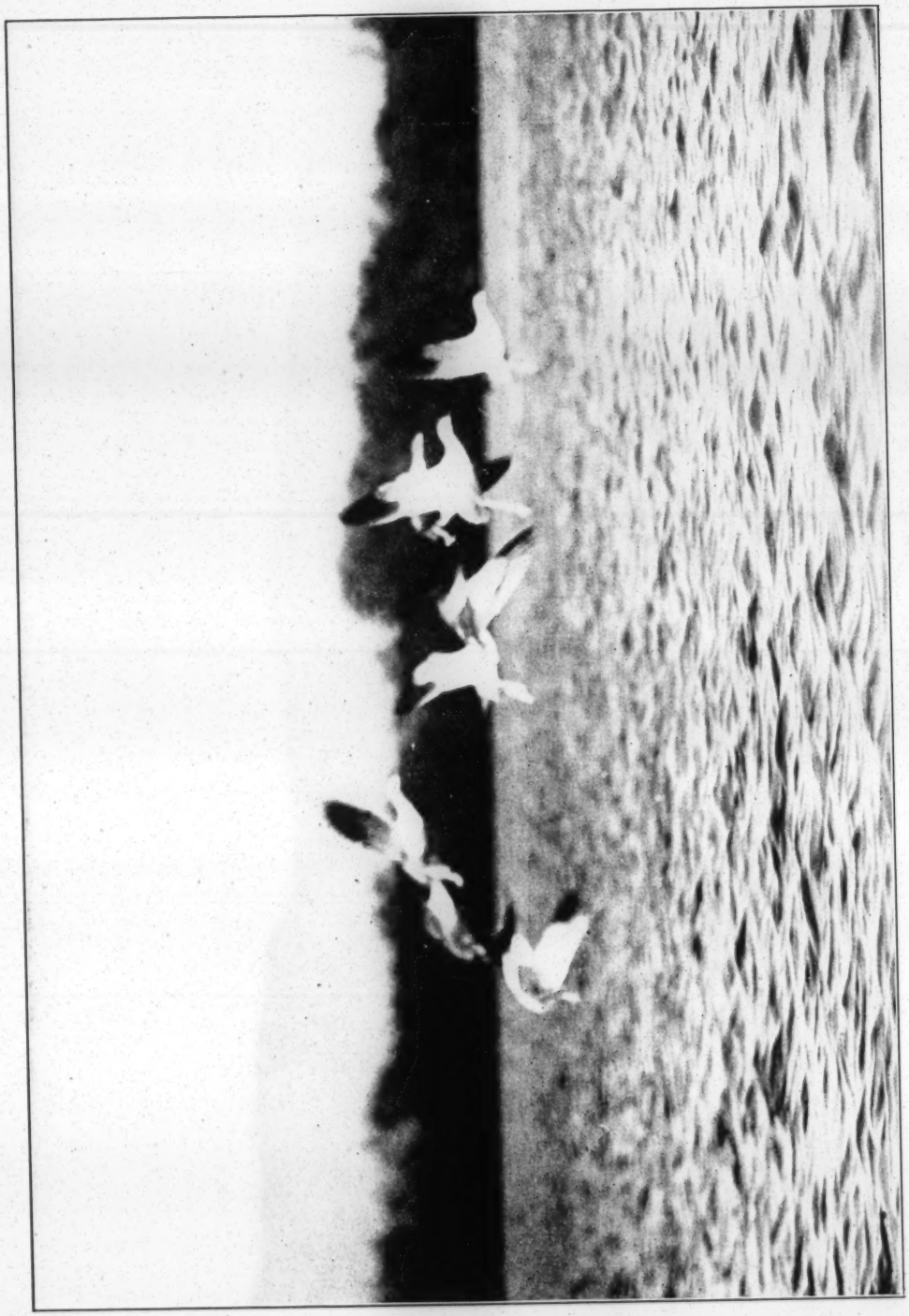
Having selected a dark, warm night, a flash-light hunter prepares his cameras, lights the jack-lamp, loads his flash-light apparatus with magnesium powder, and in his canoe pushes out into the silent



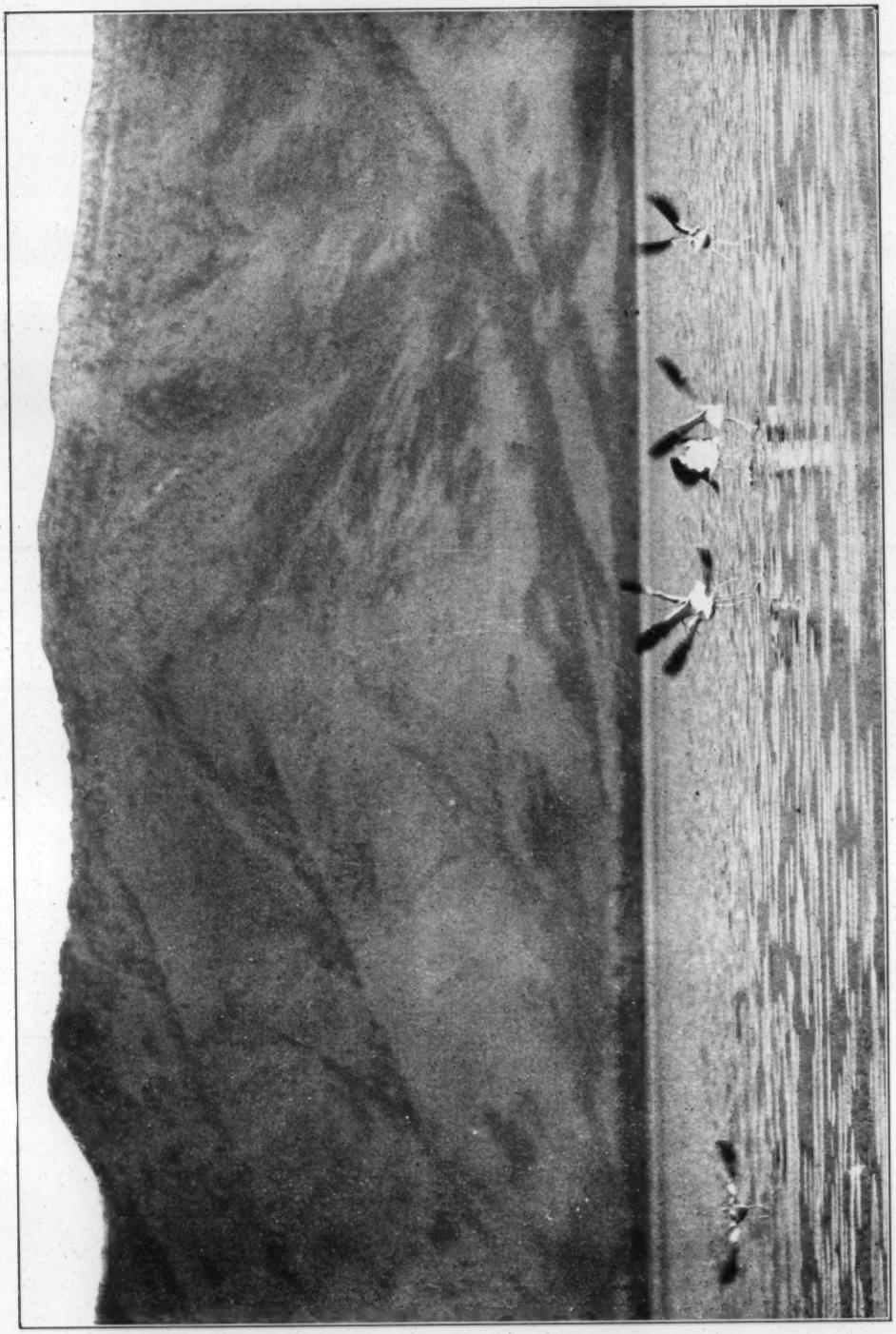
The bird left the nest on the eleventh day

waters of the lake or river. The paddle sends the slight boat ahead so easily that no sound is heard except a gentle ripple, unnoticeable a boat's length away. The wooded banks are wrapped in deepest shadow, only the sky-line along the crest showing their course.

At the bow of the boat the bright eye of the jack-light is turning from side to side, cutting a channel of light through the waves of darkness, showing, as it sweeps the banks, the trunks of trees and tracery of foliage with wonderful distinctness.



Avocets Flying over Henry's Lake, Idaho
This picture should be viewed at arm's length



Stilts, Henry's Lake, Idaho, with the Rocky Mountains as a Background

Young Sandhill Crane

Central Florida. This southern species is nearly exterminated

Butterflies Feeding on a Dead Pickerel
White Fish Lake

Flashlight. Coon Taking His Own Picture

String connected with flashlight, baited with small bass. White Fish Lake, Michigan

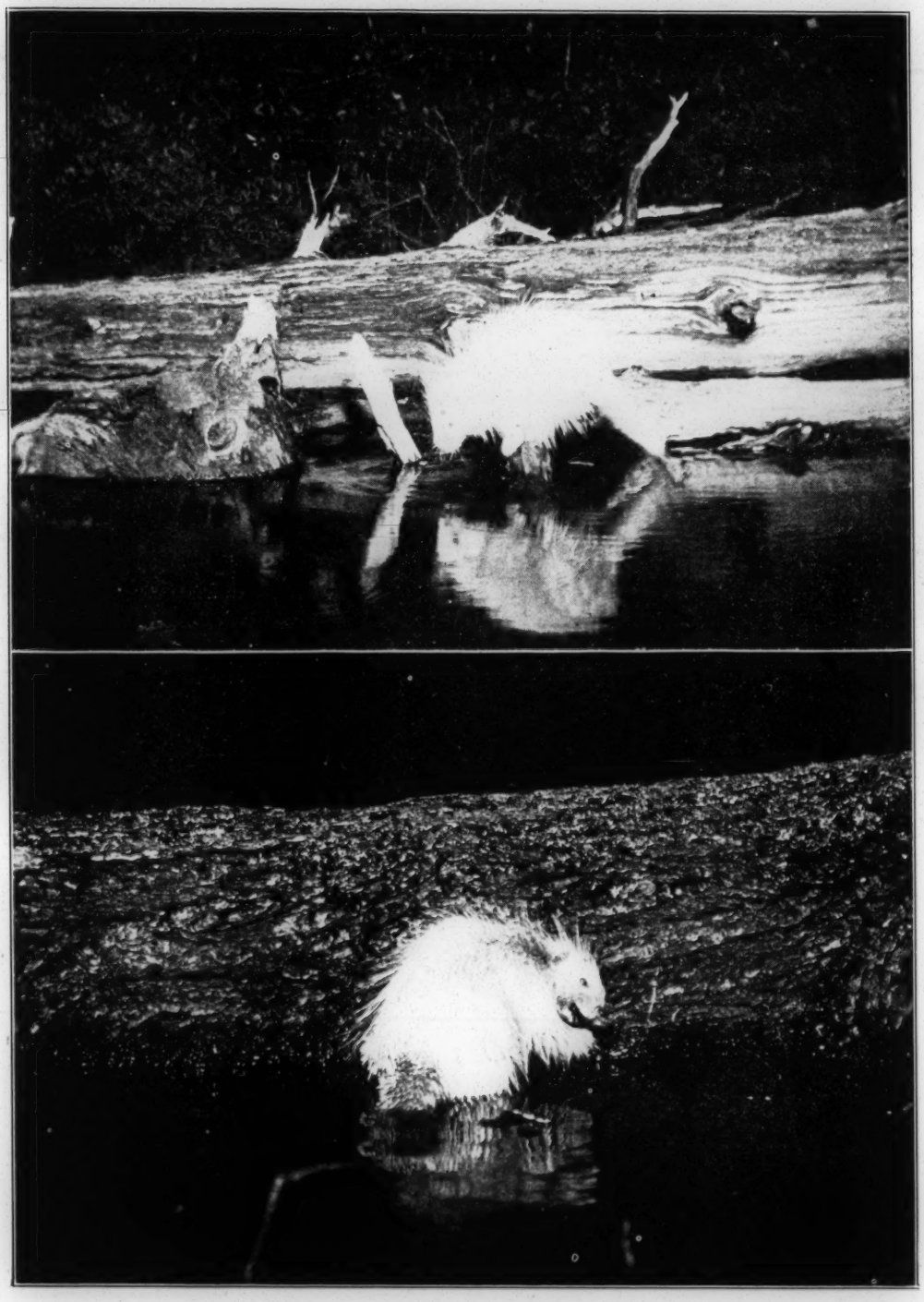
Flashlight. Coon Taking His Own Picture

String baited with old cheese. In more than thirty years coons had never been seen in Upper Michigan

Soon the quick ears of the men in the boat detect the sound of a deer feeding among the lily beds that fringe the shore. Knee-deep in the water, he is moving contentedly about, munching his supper of thick green leaves. The lantern turns about on its pivot and the powerful rays of light sweep along the bank whence the noise came. A moment more and two bright balls shine back from under the fringe of trees; a hundred yards away the deer has raised his head and is wondering what strange, luminous thing is lying out on the surface of the water. Straight toward the mark of the shining eyes the canoe is sent with firm, silent strokes. The distance is only seventy-five yards, now it is only fifty, and the motion of the canoe is checked till it is gliding forward almost imperceptibly.

Combined Daylight and Flashlight of a Porcupine Feeding on Pond Lilies

Flash fired at 7 p. m. in July



Flashlight. Albino Porcupine Pictured on Four Successive Seasons in Same Bay White Fish Lake. The second of its kind ever reported

A Blue-Haired Quilless Porcupine
A freak of nature. White Fish Lake, Michigan

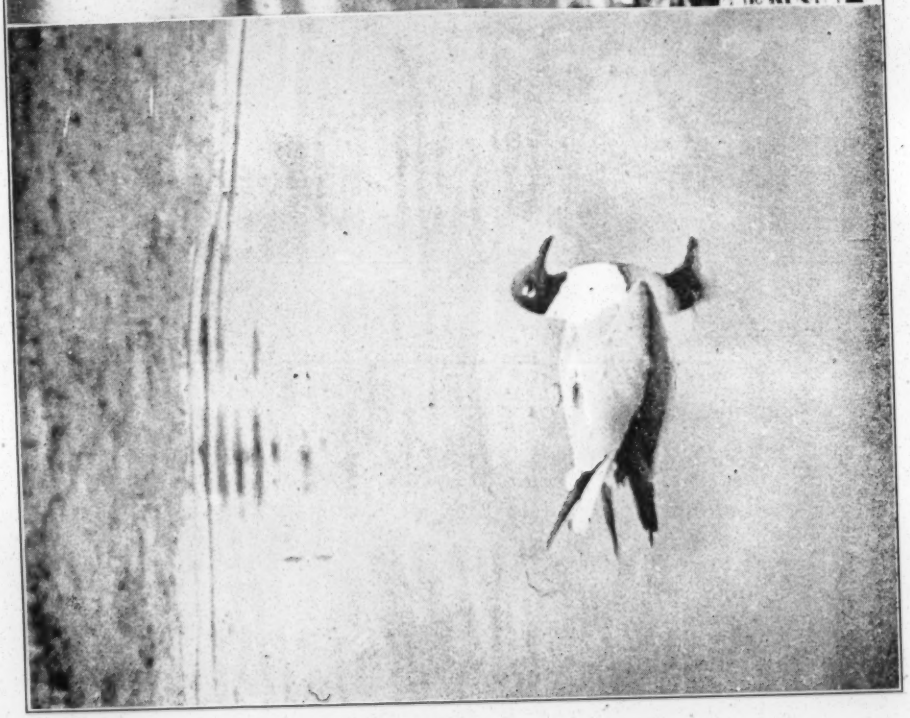
Young Night Heron
Central Florida

Cedar Bird

Lake Superior. Daylight: background of balsam 100 feet away

Mocking Bird in Florida Orange Grove Pecking at Fallen Fruit

Yellow-leg Snipe
South shore of Lake Superior



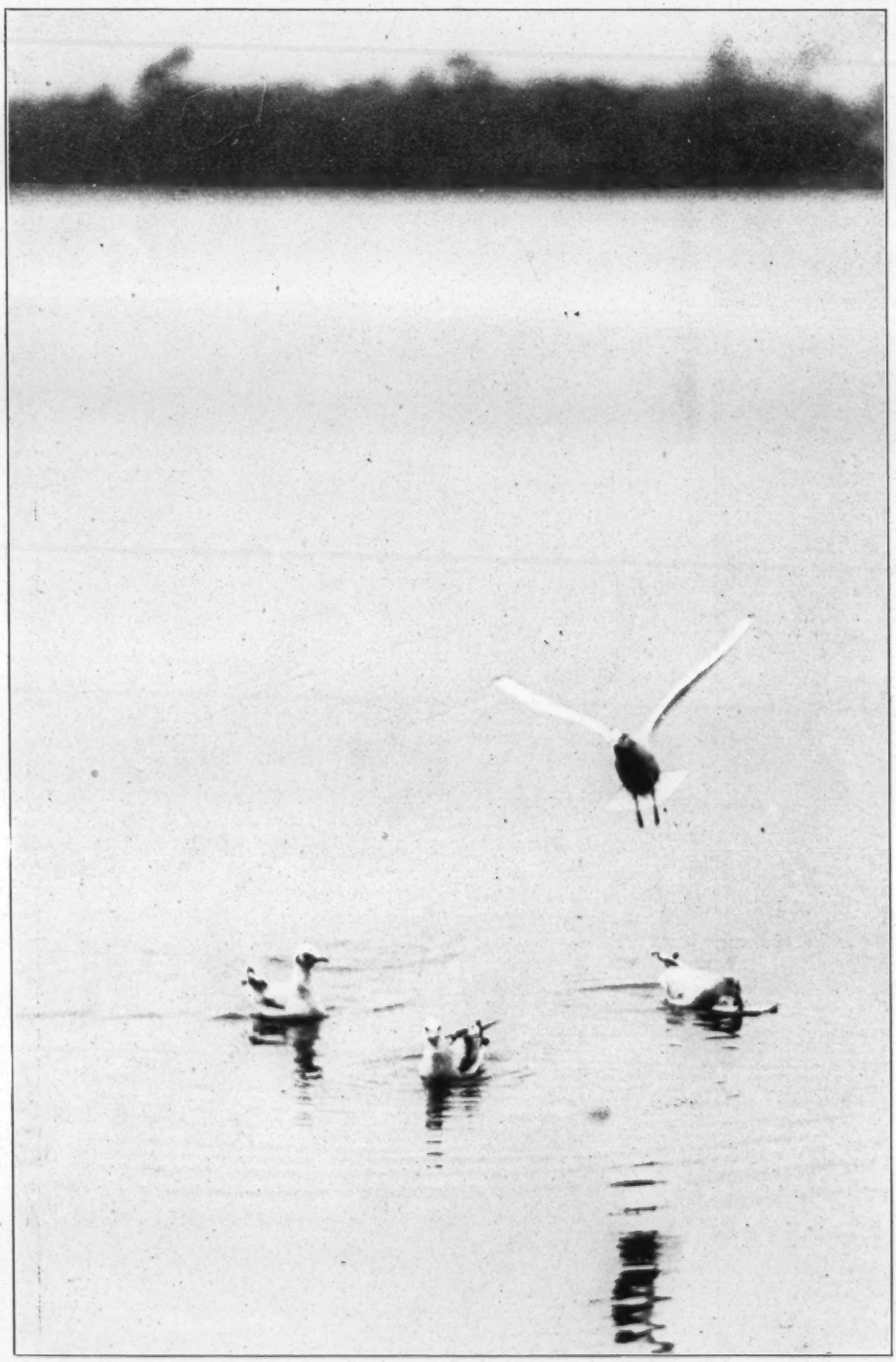
Black-headed Gull
Eastern Shore of Virginia

Great Northern Hare

Upper Michigan. Turns white in winter. Animal photographed when eating salty paper from the camp. Largely nocturnal

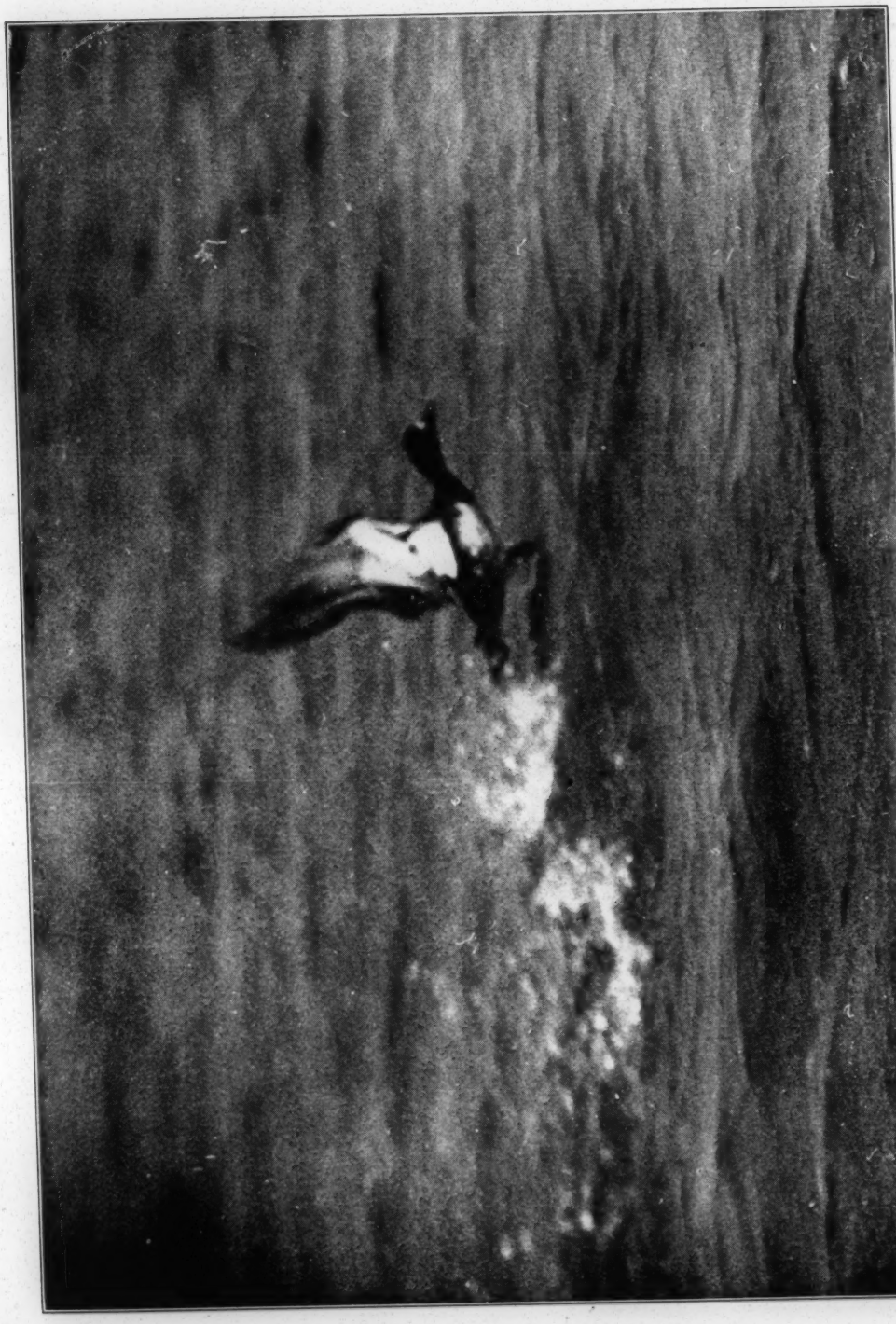
Wing Shooting with a Camera. Robin Snipe

Eastern shore of Virginia. Circling over decoy. Several are dropping. 1/1000 second exposure



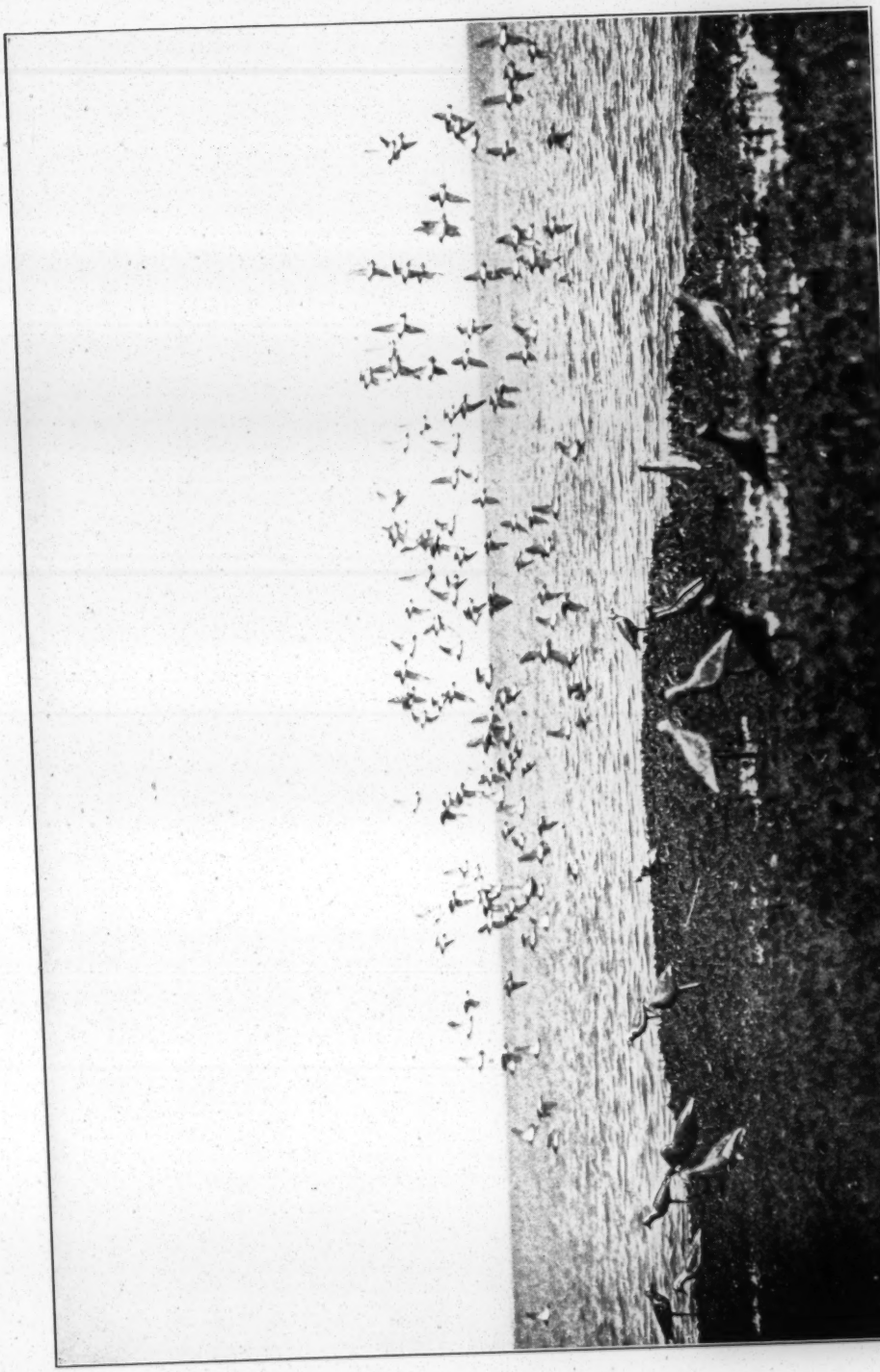
Bonaparte Gulls

Halifax River, Florida. Note the bird pecking at crust of bread



Broad-bill Duck

Mosquito Lagoon, Florida. Hold this picture at arm's length.

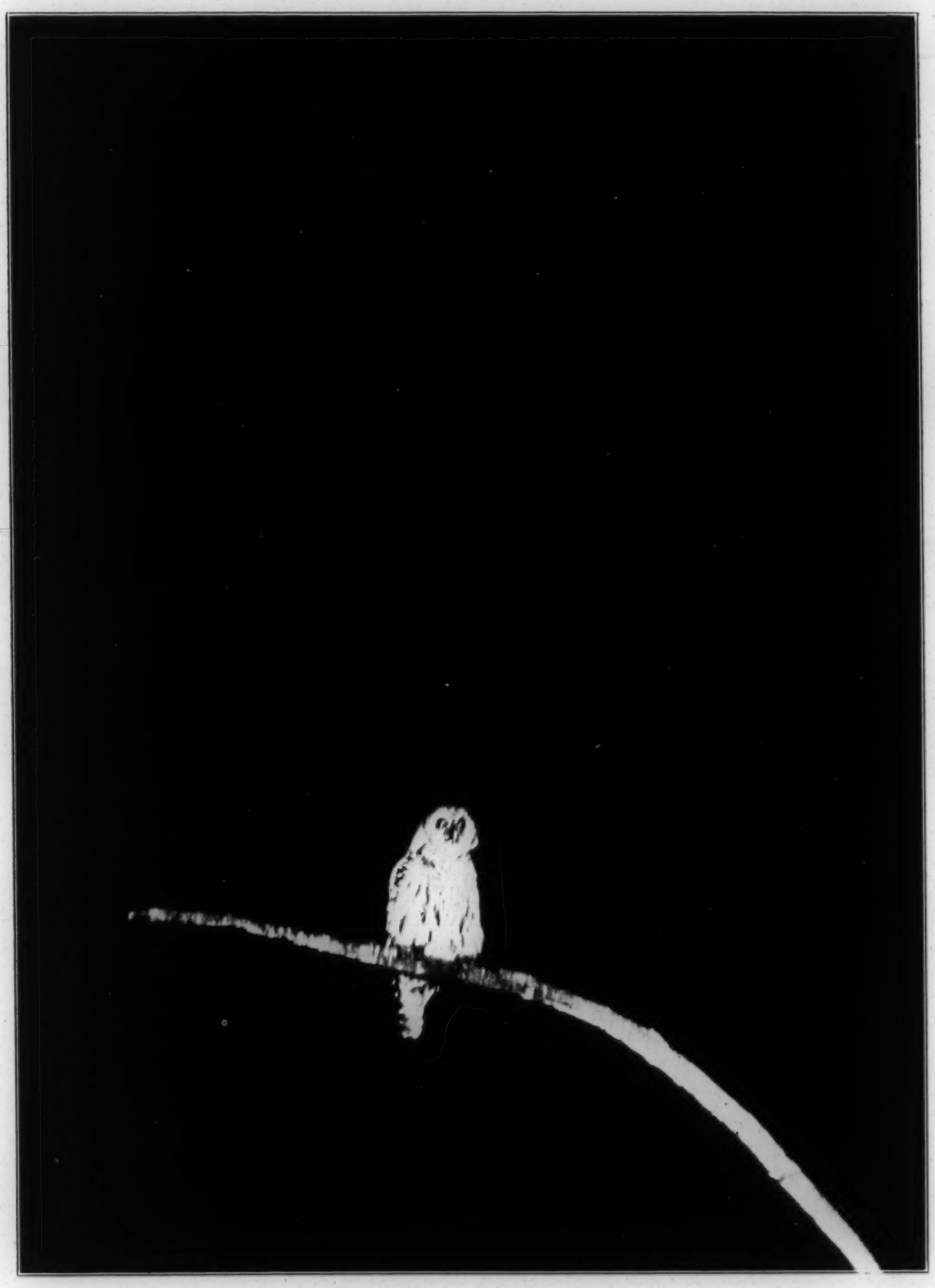


Snipe Shooting over Decoys

110 bagged in one shot. Flying 75 miles an hour. 1/1000 second exposure. Revels Island, Virginia

Flashlight. Great Blue Heron Asleep

White Fish Lake, Michigan. One of the wariest of birds. This is the first flashlight of a wild bird ever taken. 1893



Flashlight. Snowy Owl

White Fish River, Michigan. Author was looking for deer. Flash held in one hand and camera in the other. The owl fell 15 feet into the water, swore like a trooper, and waded ashore

Flashlight. Bull Moose

Matagamasing Lake, Canada. At edge of Muskeg watching jack light

Flashlight. Cow Moose

Wahnopitae Lake region, Canada. When flashlight was fired the moose charged the canoe, knocking the camera overboard. Negative immediately developed and saved. Note the "bell"

Flashlight. Bull Moose

Matagamasing Lake. Animal feeding on lily roots in five feet of water. Flash fired just as head came up. Note water pouring off neck. Author was five seasons getting a night picture of a bull moose

At this point, if the hunting were with the firearm, more largely employed, there would be a red spurt of fire from under the jack-light, and the deer would be struggling and plunging toward the brush; but there is no sound or sign of life, only the slowly gaining light. Twenty-five yards now, and the question is, Will he stand a moment longer? The flash-light apparatus has been raised well above any obstructions in the front of the boat, the powder lies in the pan ready to ignite at the pull of a trigger; everything is in readiness for immediate action. Closer comes the boat, and still the blue, translucent eyeballs watch it. What a strange phenomenon this pretty light is! Nothing like it has ever been seen on the lake during the days of his deerhood. Fifteen yards now, and the tension is becoming great. Suddenly there is a click, and a white wave of light breaks out from the bow of the boat—deer, hills, trees, everything stands out for a moment in the white glare of noonday. A dull report, and then a veil of inky darkness descends. Just a twenty-fifth of a second has elapsed, but it has been long enough to trace the picture of the deer on the plates of the cameras, and long enough to blind for the moment the eyes of both deer and men. Some place out in the darkness the deer makes a mighty leap; he has sprung toward the boat and a wave of water splashes over its occupants; again he springs, this time toward the bank; he is beginning to see a little now, and soon he is heard running, as only a frightened deer can, away from the light that looked so beautiful, but was in fact so terrifying. What an account he will have for his brothers and sisters of the forest of a thing which he himself would not have believed if he had not seen it with his own eyes. In the boat, as it slips away from the bank, plates are being changed and the cameras prepared again for another mimic battle.

Sometimes the pursuit is varied by letting the deer take its own picture.

A string is passed across a runway, or other point where the deer are likely to pass, which, when touched, sets off the trigger and ignites the magnesium powder. The same method can be used for daylight pictures, except that here a slender black thread is laid across the path, one end of which is attached to the shutter of the camera. The shutter revolves as soon as there is any pressure upon the thread, and a picture of any passing object is taken instantaneously. Not the least interesting part of this species of photography is that the operator does not know until he develops his plates what manner of beast, bird, or reptile has caused the shutter to open.

So the days pass on and the nights, with all the scents of the woods and the thousand charms of nature and of wild life; all the zest of pursuit, all the setting of the wit of man against the wit of wild beast, all the preparation for the chase, and all the cunning of pursuit, to be rewarded with tangible evidences of human skill and patience which will long outlast the details of the scene as caught by the most powerful memory.

SOUTH AMERICA

THE August number of this Magazine will be devoted principally to South America, in view of the attention directed to that region by the Pan-American Conference at Rio Janeiro during August and September. A map of the continent, 12 by 18 inches and in 6 colors, will be published; the contents include "South America 50 Years Hence," by Mr Charles M. Pepper, author of "Panama to Patagonia;" "The Niagara of South America—the Falls of Iguazu," by Mrs Robinson Wright, author of "The New Brazil;" "The Republic of Chile;" "Across the Peruvian Andes to the Plain of the Amazon," by Prof. S. J. Bailey, of Harvard College Observatory, who established the El Misti observatory; "The Shattered Obelisk of Mont Pelée," by Prof. Angelo Heilprin, and other articles.

GROWTH OF FLORIDA

THE report of the census of Florida, taken in 1905 and recently made public, shows a population of 556,690, excluding the counties of Dade, Escambia, and Orange, the census of which is incomplete. This shows an increase over 1900 of 15 per cent, a fairly rapid rate of growth. Of the population, 56.5 per cent are white and 43.5 per cent are negro, showing a slight decrease in the proportion of negroes since 1900, when it was 43.7 per cent.

As in other states, the population of cities and towns has increased more rapidly than has the rural population. The largest cities are Jacksonville, 35,301; Tampa, 22,823, and Key West, 20,498. Of these, Tampa has had a most phenomenal growth, having increased nearly 50 per cent in the last five years. H. G.

THE GOLDEN TROUT

THE finest trout in the world, says Dr Barton W. Evermann, of the Bureau of Fisheries, is to be found in a little stream of the high Sierras in southern California, called Volcano Creek. The trout is named the "golden trout;" and in beauty of coloring, gameness, and delicacy of flavor it has no equal. So far as is known, it exists only in this stream, which is about 20 miles in length. President Roosevelt recently called the attention of the Bureau of Fisheries to this unique specimen, with the result that Dr Evermann was sent to California to study its habits and environment, and to see whether it might not be introduced elsewhere. He reports that the trout is in danger of extermination, and that fishing in the stream must be prohibited by the State of California for three years, if the trout is to be saved. Dr Evermann has also recommended that the Bureau of Fisheries undertake the artificial propagation of the trout, and coöperate with the State of California in transplanting it to a number of barren streams that can be easily reached. The trout has been named *Salmoni roosevelti*, in honor of President Roosevelt. The Bureau of Fisheries has published a handsomely illustrated report on the trout by Dr Evermann.

RESTOCKING OUR RIVERS AND WATERS WITH FISH

THE popularity of the government's efforts through its Bureau of Fisheries to maintain the supply of native fishes and to stock barren or depleted waters is yearly increasing. By delivering fish at the nearest railway station free of charge to applicants and rendering assistance in various other ways, the Bureau encourages the utilization of private and interstate waters. The great commercial fishes are for the most part planted by the Bureau's employees directly in public waters.

The regular fish-cultural work of the Bureau is now addressed to about fifty different species, while a number of others are handled from time to time, and new fishes are yearly added to the list of those cultivated. The list includes the principal food and game fishes in all parts of the country, and so comprehensive have the operations become that few economically important

fishes of the lakes and streams are now neglected. The salmon and bass families have the largest number of species among those handled, but twelve other families also are represented.

About 1,750,000,000 fertilized eggs, fry, fingerlings, yearlings, and adults are distributed each year, each state and territory sharing in the distribution. Pike perch rank first, with 400,000,000; then come white fish, 330,000,000; flatfish, 203,000,000; cod, 170,000,000; yellow perch, 145,000,000; lake herring, 122,000,000; salmon (Chinook, silver, and blue back), 135,000,000; lobster, 116,000,000; lake trout, 41,000,000; brook trout, 10,000,000; shad, 33,000,000; white perch, 25,000,000; pollock, 8,500,000; bass of various kinds, 4,500,000.

In distributing the product of the hatcheries six special cars are employed. These cars are provided with small permanent crews, are equipped with all necessary apparatus for the safe carriage of young and adult fishes, and are attached to passenger trains. Many of the railroads, appreciating the benefits arising from the stocking of waters along their lines, render this service gratis.

PAPER FROM COTTON STALKS

A RECENT number of the *Manufacturers' Record* makes the following interesting statement:

It has been demonstrated that all grades of paper, from the best form of linen grade to the lowest, can be manufactured from cotton stalks. In addition to this, a variety of by-products, such as alcohol, nitrogen, material for guncotton and smokeless powder, can also be secured in paying quantities.

The time is not now far distant when paper plants equipped with all modern machinery and devices for making paper and the utilization of the other by-products referred to will be built and placed in operation throughout the cotton-growing states of the South. The establishment of these mills for the manufacture of paper from cotton stalks will develop a new industry of enormous proportions and institute the utilization of a waste product which at the present time has comparatively little or no value. It will prove the entering wedge of checking the present increasing cost of paper.

It is estimated that on an area of land producing a bale of cotton at least one ton of stalks can be gathered. Upon this basis of calculation this new industry can annually depend upon from 10,000,000 to 12,000,000 tons of raw material. This will not only furnish necessary supplies to meet all home demands, but also permit of the export of pulp or finished products to foreign countries. At the present time there is approximately $287,000,000 invested in paper mills in the United States, with but few plants located in the South. The bulk of the material going into the manufacture of paper at the present time is spruce pine, which is annually becoming more expensive on account of the depletion of the forests and the high prices which such timber commands in the markets for other uses. The utilization of a waste product such as the cotton stalk, manufactured into commercial paper, will be a boon of inestimable value to the whole country.

The practical effect of this new invention will be to increase the present value of the South's cotton crop nearly $100,000,000 annually. With the removal of the cotton stalks from the fields in the early fall, the death knell of the boll weevil will be sounded.

THE SKELETON IN LURAY CAVE

Editor National Geographic Magazine:

In your June number a description is given of a recent visit to the Luray caverns by 450 members of the society, in which you kindly refer to my own early account of the same. This is peculiarly gratifying. In the course of it, however, you throw doubt on the finding of a human skeleton in one of the lower chambers. In the interest of science, permit me to state the facts.

In October, 1878, Major A. J. Brand wrote

to the *New York Herald*, saying: "Greatly to our surprise, our candles flashed upon the perfect petrified skeleton of a man in kneeling posture, with head thrown back as if he had died in agony. Several medical gentlemen have examined it. * * * That it is the skeleton of a man there is no doubt." My own visit was a few weeks later. I wrote for the *Scientific American*, in a series of articles, a full description of all the contents of Luray Cave. Of the skeleton I said: "In a gulch near the Imperial Spring human bones are visible, including a jaw with three tooth sockets, the femur, the tibia, and the ribs—the latter fractured. The remainder of the skeleton is concealed under dripstone." I had these bones examined by local physicians, who declared them to be the remains of a young person, and our conclusion was that the remains had been there for fully 500 years. On subsequent visits I observed that relic-hunters had carried away such bones as they could dislodge; and no doubt it would tax the imagination to find now what was carried away quarter of a century ago. But we saw that skeleton in 1878. H. C. HOVEY.

Newburyport, Mass., June 26, 1906.

Rise of the New West. 14th volume of the "American Nation Series." By Frederick Jackson Turner. Maps and index. 366 pp. New York and London: Harper & Bros., 1906. $2.00.

For convenience in studying the history of the nation from 1815 to 1830, Mr Turner divides the country into sections—New England, the middle region, the South and the West—and in his review of events and conditions of that period greatest attention is given to the West, not so much as a separate geographical section as to show what bearing its opening, colonization, and growth had upon national affairs. When shortly after the close of the War of 1812 the new land was offered, to all who might wish to purchase, at $2.00 per acre, with only one-quarter of that amount as first payment, settlers flocked from the East and South, and the "West" began to grow, and soon became a recognized power in the economic and political affairs of the nation, for, to quote a sentence of Mr Turner, "by its competition, by its attraction for settlers, it reacted on the East and gave added impulse to the democratic movement in New England and New York." F. M. A.

Statesman's Year-Book for 1906. Edited by J. Scott Keltie and I. P. A. Renwick. With maps. Pp. 1604. 5 x 7 inches. New York: The Macmillan Co., 1906. $3.00.

The most important change in the issue of the Statesman's Year-Book for 1906 is the addition of 150 pages devoted entirely to the United States, and giving the constitution and government, area, population, religion, instruction, justice, charity, finance, defense, productions, and industry, and books of reference relating to each state in the Union. This addition will make this annual publication of much greater value to Americans and is much to be commended. In the American edition the information about the United States, 223 pages in all, is placed first. One of the most valuable features of "The Statesman's Year-Book" lies in the fact that its statistics are brought up to January of the year of publication. The results of the dissolution of the union between Sweden and Norway, the conclusion of the Russo-Japanese War, the upheaval in Russia, the mission to Tibet, the ecclesiastical changes in France, the recent election in the United Kingdom, and other important events have all been duly incorporated.

There are excellent maps and diagrams showing, among other things, the new Barotseland boundary; the political changes in the Far East; the tariff chart of the world; the new provinces in N. W. Canada; the subdivision of Bengal; the economic development in the United States; economic aspects of the United States, and the races of Russia.

Hints to Travellers. Ninth edition. Edited by E. A. Reeves for and published by the Royal Geographical Society. Two volumes. Pp. 742. 5 x 7 inches. Illustrated. London, 1906.

The Royal Geographical Society has found it necessary to publish a ninth edition of "Hints to Travellers," so great has been the demand for this valuable work. A large amount of new matter has been added, such as the more recent surveys and accurate data relative to heretofore unexplored regions. An introductory chapter on geographical surveying, suited to modern requirements, and new astronomical examples are given, while the forms for computation have been altered to give greater accuracy in results. A new section on archæology, with new and important notes on anthropology, is included. For those who are not familiar with the work, it may be said that "Hints to Travellers" is probably the most thorough, practical, and valuable handbook of its kind ever published. Volume I covers clearly every point for surveys and astronomical observations and illustrates the necessary instruments and their adjustments. There are chapters on practical astronomy, observations for time and longitude, obsrvations for azimuth and error of compass, and a formulæ of plane and spherical trigonometry; also scales and projections of maps, with many diagrams and tables. Under the cover of volume I are detached maps of the northern and southern constellations. Volume II contains chapters on meteorology and climatology, with tables and charts showing temperature and winds. There are sections giving valuable medical information, notes on natural history, photography, glacier observations, and mountain travel. J. O. L.

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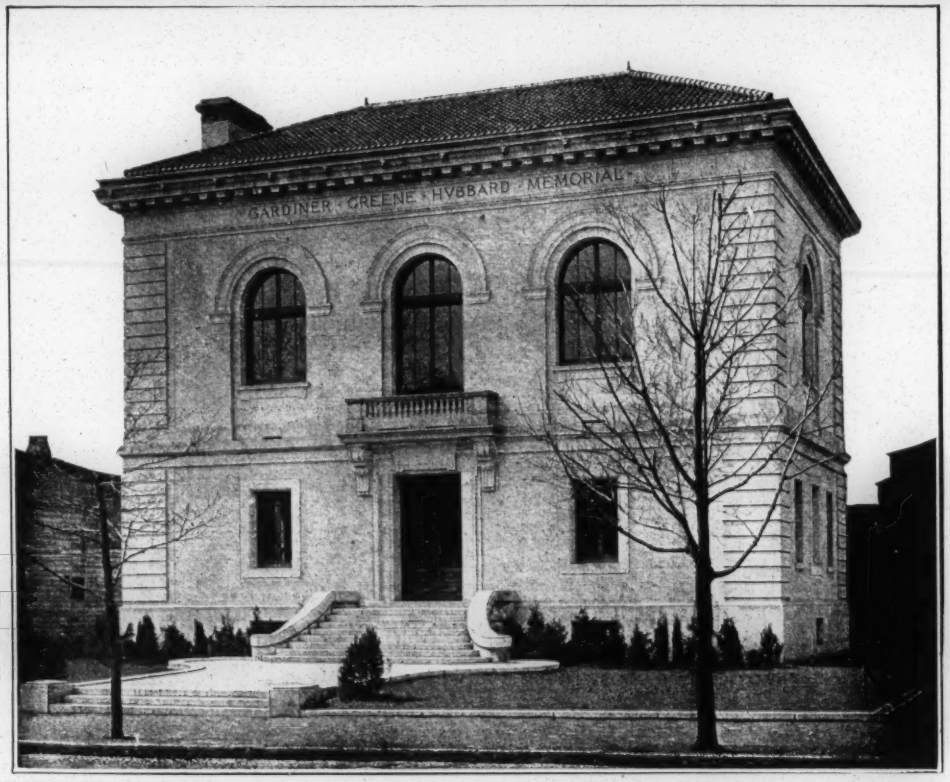

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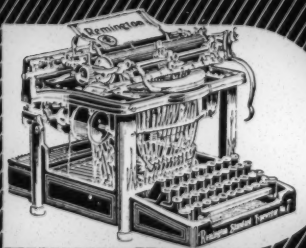

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